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ABSTRACT

This final report describes the Lawrence Children's Health Project (LCHP), set up in Lawrence, Massachusetts in 1979, in order to demonstrate and evaluate the feasibility and cost-effectiveness of an interagency approach to providing health care to children through a school-based local resource network. The LCHP service delivery is said to have met the mandates of both Federal (Early Periodic Screening, Diagnosis and Treatment) and State (Special Education Chapter 766) laws. The project enrolled over 85 percent of the students in six schools and screened over 2,000 children. The major project elements are described: enrollment, screening--physical and developmental, referral, follow-up, client flow, training, billing, management information system (MIS), and brokering. A short discussion of future project activities is followed by a section dealing with the major milestones for each of the project's objectives: broker model; service delivery; MIS; training; and evaluation and dissemination. A financial statement is followed by detailed appendices: (1) a list of major project products and reports; (2) an early childhood pamphlet (English/Spanish); (3) an organizational chart; (4) a school health-policy guide ; (5) a summary report (Spring 1982); (6) a description of the microcomputer information system ; and (7) the Merrimack Education Center's letter of agreement with the Lawrence public schools. The report concludes that the LCHP has demonstrated that brokering of children's health care can be coupled with school-based EPSDT (Early Periodic Screening, Diagnosis and Treatment) services as a realistic alternative to conventional models of health service delivery for children. (CMG)

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LAWRENCE CHILDREN'S HEALTH PROJECT/EPSDT

A PROPOSAL TO INTEGRATE HEALTH AND SPECIAL EDUCATION SERVICES FOR CHILDREN IN A SCHOOL-BASED DEMONSTRATION PROJECT

FINAL REPORT

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TABLE OF CONTENTS

		PAGE
	EXECUTIVE SUMMARY	i
I.	INTRODUCTION AND PROJECT OBJECTIVES	1
II.	SUMMARY OF PROJECT	6
	A. HISTORICAL DEVELOPMENT OF PROJECT	7
	B. MAJOR PROJECT ELEMENTS AND FINDINGS	9
	1. Enrollment	9
	2. Screening - physical & developmental	12
	3. Referral	15
	4. Follow-up	18
	5. Client Flow	18
	6. Training	19
	7. Billing	21
	8. Management Information System	24
	9. Brokering	28
	C. FUTURE PROJECT ACTIVITIES	30
III.	MAJOR MILESTONES FOR EACH PROJECT OBJECTIVE	31
	A. INTRODUCTION	32
	B. BROKER MODEL	34
	C. SERVICE DELIVERY	36
	D. MIS	41
	E. TRAINING	43
	F. EVALUATION & DISSEMINATION	45
IV.	FINANCIAL STATEMENT	48
V.	APPENDICES	50

A. LIST OF MAJOR PROJECT PRODUCTS AND REPORTS
B. EARLY CHILDHOOD PAMPLET (ENGLISH/SPANISH)
C. ORGANIZATION CHART
D. SCHOOL HEALTH POLICY GUIDE
E. SUMMARY REPORT - SPRING, 1982
F. MICROCOMPUTER INFORMATION SYSTEM
G. LETTER OF AGREEMENT WITH LAWRENCE PUBLIC SCHOOLS
H. ABT EVALUATION REPORT - "LAWRENCE CHILDREN'S HEALTH PROJECT: A DEMONSTRATION OF A COLLABORATIVE BROKERING MODEL AND SCHOOL-BASED EPSDT" (under separate cover)

LAWRENCE CHILDREN'S HEALTH PROJECT

EXECUTIVE SUMMARY

The Lawrence Children's Health Project (LCHP) demonstrated an alternative approach to providing health care to children through a school-based model for Early Periodic Screening, Diagnosis and Treatment (EPSDT). The LCHP service delivery, carried out by the Merrimack Education Center (MEC), met the mandates of both Federal (EPSDT) and State (Chapter 766[1]) laws.

Within the urban environment of Lawrence, Massachusetts, where many children were not receiving legally mandated health services, MEC collaborated with state and local agencies with the goal of improving health services for children. The overall purpose was to detect potentially debilitating health problems and to ultimately improve the health status of the student population. This was accomplished through five major objectives, which were established for the project at the outset.

1. Design and implement a contracting brokering mechanism operating through a collaborative, that will interface local schools and medical service providers, and promote cooperation to assure the EPSDT requirements are being satisfied.

2. Provide access to special education, health, and ancillary services through a school initiated single intake, evaluation, and case management system for all children in the project area.

3. Design and implement a management information system for (a) case management records; and, (b) billing procedures.

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1 Special education legislation for free and appropriate education; State mandates for Individualized Education Plan (IEP) as with P.L. 94-142.

4. Design and implement a comprehensive education program for children, parents, local school principals, physicians and related health professionals, and others involved in the demonstration to inform them about the goals and operation of the project, to instruct them regarding their individual roles in the proposed system, and to educate them regarding health and health care.

5. Evaluate the effectiveness of the project and disseminate the results of the evaluation, along with the other project materials, throughout Massachusetts and the nation.

Collaborative relationships with service organizations provided integration of the fragmented services usually obtained through categorical programs. This model has considerable potential for increasing the cost-efficiency and effectiveness of health care services while reaching a larger number of children.

Several legal mandates have pushed schools toward concern with children's health. Federal and state laws concerning special education and the handicapped require health and developmental screening and special services. School health regulations require monitoring of selected health services at selected ages. Relevant federal legislation for Medicaid-eligible children requires regular preventive and curative services through the Early Periodic Screening, Diagnosis and Treatment Program (EPSDT). Therefore, schools play a critical role in this collaborative approach and they provide an excellent point of access to children through a school-based model of integrated health services.

The main focus of the demonstration grant was to provide school-based EPSDT services and to integrate overlapping service requirements for students in participating schools. This was accomplished through several major program elements.

Major Program Elements

The work of the demonstration project can be separated into a few major elements: enrollment, screening and referral, follow-up and

management to link families with resources. The health service component performs initial data collection, screening, referrals, and follow-up of problems identified while a support component administers training for school staff members, billing and the management information system (MIS). These separate functions interact throughout the course of a client's involvement in the project to form an integrated pattern of services.

Project Accomplishments and Selected Fundings

Six of the 13 elementary schools in Lawrence participated in the project. Between 61 and 96 percent of the student populations of these schools was enrolled in the LCHP, with an overall enrollment of 81 percent, which comprised a total of 2,235 children enrolled in the project. Initial data collection included a health history and a teacher's assessment of the child's school functioning. Screening included a physical examination by a nurse practitioner, selected laboratory tests, and an assessment of neurological and motor development. Overall, 2,189 screens were performed for school children, which includes 207 rescreens carried out the year after the initial screens. The number of children screened constitutes 72 percent of all children in the participating schools, and includes medicaid-eligible students and others.

Referrals and follow-ups were conducted by family health workers, who assisted families in identifying appropriate providers and in making appointments and necessary arrangements to obtain suitable care (e.g., transportation, day care). Training activities focused primarily on staff members, although there were efforts to develop health information packages and some community outreach education, with school staff and parents.

To make use of existing funding sources, the LCHP organized a billing component to obtain reimbursement for Medicaid services as an alternative provider for EPSDT. Through this mechanism, screening services provided by the LCHP were reimbursed at Medicaid rates from the Massachusetts Department of Public Welfare. Examinations of children not eligible for Medicaid were also paid by grant funds, under a special waiver. A microcomputer-based management information system was established to accommodate individual records and to facilitate case management.

Demographic Data

In 1981, detailed analyses describing important characteristics of the participating children were carried out for 650 elementary children attending three schools considered to be representative of the entire project populations.[2] These results and the findings on children are based on initial examinations of these 650 elementary school children during the second operational year of the project, 1980-1981.

Over half of the children (60%) were of Hispanic origin, and more than one-quarter (29%) were white. The balance of the children were from varied ethnic backgrounds. The children's predominant family characteristics were those associated with poverty. The majority of children (62%) came from single-parent households that had moved more than once in the previous three years - percent of these households were headed by one parent--the mother; furthermore, forty-two percent of the mothers had an eighth-grade education or less.

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2 For the full report of this comprehensive evaluation of school children and their preschool siblings, see: John Himes, Evaluation of the Lawrence Children's Health Project, Abt Associates, Cambridge, Massachusetts, 1981.

Approximately half of the children came from families supported by employment, and about one-quarter of the children's families were supported by welfare. Over one-sixth (18%) of the children participating in the LCHP were in families for whom no form of financial support was reported. Almost all children (89%) received free or subsidized lunches at school and most (65%) received AFDC and Medicaid support and services. About one-quarter (26%) had Blue Cross or other family health insurance. Clearly, the LCHP population must be considered as economically disadvantaged, and characterized by high unemployment and considerable dependence upon welfare and other public assistance.

Accomplishments and Selected Findings

Among the accomplishments that signal success on the part of the project, are the following milestones:

- Established alternate provider status for EPSDT billing and services.
- Achieved high rate of compliance with state regulations for immunization.
- Obtained permission for direct Medicaid reimbursement for the neurodevelopmental examination.
- Contracted with the Lawrence Public Schools to oversee the school health program for the city during 1982 and 1983.
- Screened preschool siblings of the enrolled population during summer vacation.

When five criteria specific to the collaborative and brokering mechanisms were assessed in detail, the project demonstrated success in:

1. Providing services which meet appropriate standard of quality with appropriate follow-up.
2. Achieving integration and coordination of existing and newly established services.
3. Increasing the responsiveness of provider (and consumer) organizations to the needs of the target population.

4. Providing services cost-effectively.

5. Developing a replicable model of collaborative brokering service delivery.[3]

Findings on children resulted from analyses of the sample of children described above. As a group, Lawrence children were not well integrated into the previously existing health care systems. Thirty-one percent of the children's families reported that they had no routine well-child care, and 33 percent reported no regular dental care. Rates of children fully immunized for polio and DPT at the time of their initial visit were considerably below state averages.

LCHP children were characterized by higher than expected rates of low birthweight and gestational prematurity, a factor which is frequently associated with learning difficulties in school. Furthermore, these are risk factors for subsequent morbidity and mortality in young children. Regarding postnatal growth status, LCHP children tend to be slightly shorter but slightly heavier than U.S. norms. There is no indication, however, that this population is at risk of obesity. Additional data were gathered in four risk categories for health or school functioning.

Children at Risk

By combining a wide range of findings and family characteristics, four risk categories were defined: Medical Care risk, Demographic risk, Medical History risk, and Physical Findings risk. The interpretation of "at risk" in this context is that a child (or group) so classified has a constellation of findings that indicates an increased probability of health consequences related to a specified area. Over 40 percent of the

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3 For further information on these accomplishments, see: Ron Szczypkowski, Evaluation of Lawrence Children's Health Project Brokering and Collaborative Mechanisms, MAGI Educational Services, Inc., Larchmont, New York, 1981.

children were considered at risk because of inadequate medical care, and over one-third (37%) were at risk because of demographic characteristics. At least (6%) of the children were at risk for more than one set of factors.

Almost all children (93%) were determined to have at least one health problem. The most frequent problems had to do with inadequate health care (64.4%) and dental problems (31.4%). Immunization requirements for school attendance were not met by a large percentage of the population. Seventy-nine percent of children had problems that required referral to someone other than parents for health or other developmental concerns. Despite the school's heavy concentration on visual and hearing testing, 15% of these children were described by the nurse practitioner as needing additional referral for these areas. Analyses showed that occurrence of health problems was related to many specific family and health care characteristics.

Major Conclusions

Conclusions were drawn across aspects of the project, with the intent of providing broad applicability to the collaborative approach and to other important aspects of health service delivery.

1. There are children in Massachusetts who are not receiving adequate health care and, therefore, are at risk of not attaining optimum health.

2. There is a need for coordination of services to provide systematic screening and referral of children and to assist families in obtaining health services.

3. The collaborative approach has been successful in increasing access to EPSDT services for both Medicaid-eligible children and other children in Lawrence by using brokering.

4. The school is an effective site for reaching providing health screening and brokering health services to large numbers of children.

5. A collaboration among existing agencies, organizations, and providers suitable for brokering health care for children is feasible and has been established.

6. The brokering strategy can be adapted to local needs and resources in a cost-effective manner.

7. Brokering special health needs of groups of children may provide special services generally unavailable to individual families and children.

8. The collaborative approach has improved health services for children through increased comprehensiveness, more efficient utilization of existing services, and integration and coordination of new and existing services.

9. A project support team of nurse practitioner and para-professional family health worker appears to be a successful approach to providing families with the assistance they need.

10. LCHP has demonstrated that brokering of children's health care can be coupled with school-based EPSDT services as a realistic alternative to conventional models of health service delivery for children.

Publications prepared under this grant from the Health Care Financing Administration, are found in Appendix A of this Final Report.

I. INTRODUCTION & PROJECT OBJECTIVES

A. INTRODUCTION

It is believed that the early identification of health problems can improve the health of children and their performances in school. The Lawrence Children's Health Project/EPSDT has demonstrated that a meaningful comprehensive child health assessment project can be implemented through the public school.

The Lawrence Children's Health Project has tested a program which provides for continuity of comprehensive health assessments through the school and has demonstrated the practical value of strengthening the tie between schools and a wide variety of community resources. Methods and procedures have been developed so that Project staff can provide comprehensive health assessments for children. Procedures are installed so that the students can adequately receive diagnosis, treatment and follow-up services as needed.

Section II of this final report reviews the major activities of the Project. The work of the Project can be separated into a few major activities: Enrollment, Screening, Referrals, Follow-up, Client Flow, Training, Billing, Management Information Systems, and Brokering. In addition, the Project has recently taken responsibility for the supervision of the School Health Program in the Lawrence Public Schools.

In addition, the intended future activities of the Project are reviewed. It is now clear that the Project services were needed and that the program will continue with state and local support.

Section III presents a timeline of the Major Milestones reached during the three service years of the Project. Starting a new Project with no prior staff or relationships with community agencies takes a major effort and devotion of resources. The Federal demonstration grant provided the catalyst to get the program started. As each milestone was reached, the Project was able to demonstrate the feasibility of this

model of a school-based broker. Further, each successful milestone built the foundation for the future when the Federal grant would end.

Section IV provides the Financial Statement for the Project and the Appendices present some report and products not previously submitted to HCFA, including the final evaluation of the Project by ABT Associates, Inc.

B. PROJECT OBJECTIVES

The Title of this Project was the Lawrence Children's Health Project/EPSDT. The goal of this Project was to demonstrate and evaluate the feasibility and cost-effectiveness of an inter-agency approach to delivering high quality educational and health services to the city's children through a school-based local resource network. That service delivery system met the mandates of both Federal (EPSDT) and state (Chapter 766 and School Health) laws and did not discriminate against Medicaid recipients.

Five major objectives were met in achieving this overall goal:

1. Design and implement a contracting/brokering mechanism operating through a collaborative, that will interface local schools and medical service providers, and promote cooperation to assure that EPSDT requirements are being satisfied.

The Broker Model became a very effective method of identifying needs and linking children and families to providers who could meet those needs. This approach allowed for optimum utilization of resources and prevented duplication of effort. For instance, the Project could arrange with area providers for lab work, Sickle Cell counseling, or lead screening and counseling.

Preventive health care must be taken to the population and children are in schools. The Project made successful entry into schools and was

thus able to reach 81% of the target population. School personnel were very supportive of the Project because they could see the need for the services. Thus, the Lawrence Children's Health Project model was effective in linking the schools to local providers.

2. Provide access to special education, health, and ancillary services through a school-initiated single intake, evaluation, and case management system for all children in the project area.

There are many potential barriers to access to health and special education services. The Project was able to reduce or eliminate these barriers by actively doing outreach to inform families of the services; by providing services in a convenient location (the neighborhood school); by effectively providing screening services; by strong advocacy and case management to other providers; and by hiring bilingual and bicultural staff. Further, financial barriers were eliminated by offering services to all children regardless of ability to pay and by assisting families to pay for diagnostic and treatment services. Even transportation and translation services were provided at times to minimize any barriers.

Some pediatric services were available in the Lawrence area. The Project enhanced the accessibility of these services so that children had a better chance of receiving care.

3. Design and implement a management information system for (a) case management records; and (b) billing procedures.

The Project did develop a management information system which consisted of a set of manual procedures for billing and a microcomputer-based system for case management. From the early stages of the Project, it was clear that the small volume and lack of diversity in the Project's billing required only a manual system. The Project effectively identified Medicaid-eligible children without discriminating in any way and then processed the proper forms for submission to the state billing office.

The case management system took longer to develop as the Project needed to carefully determine the needed data and the most appropriate system. To keep track of all Project children and where they are in the client flow, a computerized system was needed. After an attempt to modify a minicomputer system, the Project opted for a simpler, more self-contained microcomputer system.

4. Design and implement a comprehensive education program for children, parents, local school principals, physicians and related medical, health professionals, and others involved in the demonstration to inform them about the goals and operation of the project, to instruct them regarding their individual roles in the proposed system, and to educate them regarding health and health care.

An effective outreach, orientation and ongoing education program assured that: the Project staff worked together; that the maximum number of families were informed about the Project; and that the school and health personnel in the community were aware of the Project. In addition, educational materials supplied to parents by the Project or by brokered providers aided families to better understand their children's needs.

5. Evaluate the effectivenss of the project and disseminate the results of the evaluation, along with the other project materials, throughout Massachusetts and the Nation.

The Project has been evaluated by outside, independent reviewers who have had extremely positive findings. In addition, the project has responded to numerous requests for information about the Project and has prepared a slide tape show to aid in disseminating the results of the demonstration.

II. SUMMARY OF PROJECT

A. HISTORICAL DEVELOPMENT OF PROJECT

In the mid 1970's, there was a growing need for an effective model of services which could integrate the many required services for children in Massachusetts. School health laws required physical exams, vision and hearing screening (more recently posture screening) and immunizations for all children. Special education laws required physical exams, home visits (history and environmental information) and specialty testing for selected children (as many as 15% of school children, 3-21). Medicaid regulations did not require but strongly encouraged preventive health care including physical exams, lab tests, histories, vision & hearing screening, and specialty testing. In addition, as special education programs grew, the financial pressures on school systems also grew and alternative funding was needed. Finally, there was a desire on the part of Federal and state Medicaid officials to expand the Massachusetts EPSDT program to reach a larger number of children.

The Merrimack Education Center (MEC) was in a position to pull these multiple problems into one model which would integrate the overlapping service requirements, bring additional revenues into schools, and provide EPSDT services to a larger number of children. The model MEC used was based on a brokering model previously used effectively in the educational environment. The model allows for a resource manager who can determine the level of both needs and resources. The manager/broker then links the two together to arrive at an efficient utilization pattern. The model assumed that community providers existed or would develop to meet needs and that a broker (the Project) would not have to create or duplicate services.

At the state level, the Massachusetts Department of Education was looking at special education requirements and had been discussing the funding issues with the Massachusetts Department of Public Welfare, the state medicaid agency. In turn, the Department of Public Welfare had many pressures (including a Federal court suit) which were directed

toward the Project Good Health (EPSDT) program's inability to reach a substantial number of eligible children (less than 5%). The City of Lawrence was looking for help with its special education and school health programs. In addition, there was a high number of Medicaid-eligible children in Lawrence, a city with a limited number of primary care health providers (in 1978, a portion of Lawrence was designated by the Federal government as a medical manpower shortage area because of the lack of primary care physicians).

The Merrimack Education Center, Inc. was a multiservice center which includes Lawrence within its primary service area. In addition, MEC had a strong reputation for service delivery--for education, special education, and specialty programs. In conjunction with the interested organizations, MEC prepared a proposal for the Massachusetts Department of Public Welfare to submit to the Health Care Finance Administration (HCFA) of the U.S. Department of Health, Education and Welfare (now the Dept. of Health and Human Services). The HCFA had demonstration funds under Section 1115 of Title XIX of the Social Security Act. In May of 1977, the proposal was submitted to HCFA in hopes that they would be willing to support á school-based EPSDT program.

After some deliberation and revisions in the original proposal, the grant award was made, effective September 30, 1978. Unfortunately, the staff of the Massachusetts Department of Public Welfare who had worked on this proposal were no longer working for the state and so it was not until March 28, 1979 that a contract could be negotiated between D.P.W. and MEC. (The grant had to be awarded to the state D.P.W. because of Section 1115 regulations.) D.P.W. contracted with MEC to implement the Project.

Merrimack Education Center was then able to hire staff; make arrangements with the Lawrence schools; contact local providers; arrange for office space; contract with Children's Hospital Medical Center in Boston for a Pediatric Fellow to support the Project; and to establish a plan for implementation. The orientation for teachers at the first Project school was held in December, 1979 and the Project was underway.

Over the next two and one-half years, the Project enrolled over 85% of the students in seven schools and screened over 2,000 children. As the Project staff gained experience, they revised forms and procedures so that the system could be more efficient. By June, 1982, the Project became an integral part of the school system, managing not only physical exams but also the school health program--supervising school nurses, scheduling posture screening, and keeping immunization records. The major elements of the Project and the major milestones reached during the Federal Project Period are discussed further in other portions of this report. Reaching these milestones took dedication on the part of the Project staff as well as flexibility to change as the Project evolved.

The dedication has paid off as the Project moves into a new phase in the Fall of 1982. The Federal grant will be completed. Through a combination of billing to the state for Medicaid-eligible children and financial and in-kind support from the Lawrence Public Schools, the Project will continue to screen students, broker for services, and coordinate the school health program.

B. MAJOR PROJECT ELEMENTS AND FINDINGS

1. Enrollment

Parents interested in having their children participate in the Project completed an enrollment form that served as the identification and registration of the child. Included in this registration form was approval by the parent to secure necessary information from the school or providers and to release information to providers, if necessary, as a result of the screening activities.

In order to involve the greatest number of families in the project, the enrollment procedures included a variety of activities. Each activity was geared to provide information on the project, to allow personal contact with the family, and to gain participation on the part of the family in the project.

With active participation of the Principal and the staff of the school, enrollment efforts moved from general appeal to specific one-to-one contact. The activities progressed as follows:

a) An orientation meeting with the principal of the school to review the goals, procedures and activities of the project.

b) A meeting for teachers was held to explain the project and their anticipated level of participation.

c) A letter in English and Spanish was sent through the school to each home. The letter provided basic information on the project and invited parents to a meeting at the school.

d) A day and evening orientation meeting were offered for parents. At the orientation meeting transparencies and hand-outs were used to give a general overview and description of the Project. This was done in English and Spanish. Following the general discussion the group was broken down into smaller groups so that the staff could answer questions and explain the Project in more detail. Those parents who wished to enroll their children did so at this meeting.

e) Parents who did not attend one of the orientation meetings were sent a letter inviting them to a second meeting at the school. Approximately twenty percent of the enrollment at the first three schools came from these meetings. For the last three schools the meetings became less a factor and major enrollment occured through letters and personal visits.

f) Parents who did not respond to any of the school meetings were sent personal letters explaining the Project with an enrollment form inviting them to enroll by return mail.

g) Families who were not enrolled at this point were contacted by telephone and/or through a personal visit.

Table I illustrates the success of the Project in enrolling children in the program. At the Hennessey School, the first school, over eighty-nine percent (89%) of the children were enrolled. In the Tarbox School, the second school, ninety-four percent (94%) were enrolled. While some of the Tarbox increased enrollment can be attributed to staff experience, it was felt that much of it was due to the use of school

TABLE I

PROJECT ENROLLMENT & SCREENING

January 1980 - June 1982

	No. of Students	No. Enrolled	Percent Enrolled	No. Screened At Least Once	Percent of Enrollees Screened
Arlington	275	264	96.0	219	82.9
Lawlor	505	313	61.9	264	84.3
Leahy	556	489	87.9	435	88.9
Leonard	422	256	60.6	209	81.6
Hennessey*	590	526	89.1	487	92.5
Tarbox*	409	387	94.6	368	95.0
TOTAL	2,757	2,235	81.0	1,982	88.6

* Rescreens at Hennessey = 160
at Tarbox = 47
207

So Total Screens & Rescreens = 2,189

August 1982

staff to make personal visits to families to enroll and complete the health history. Using this personal visit approach, more families were contacted personally by the school and subsequently decided to participate in the program.

2. Screening

a) Health History

Following the enrollment of the child, an appointment was scheduled with the family to complete the review of the child's medical history. The historical data was reviewed by the Project's Nurse Practitioners prior to doing a physical exam. In the first three schools this was done by regular Project staff, the Family Health Workers, usually in the school and at the convenience of the parents. For the last three schools the history was taken by staff specially trained for enrolling children and taking health histories. These history takers became an important part of the process -- they generally were bicultural, community workers who worked part time for the Project. They went to the children's houses, explained the Project, enrolled children, and took the historical information.

In addition to the health history, a medical coverage form was completed by the family health worker. The medical coverage form provided information on insurance coverage and medical eligibility. Table II summarizes the medicaid coverage of children in 5 of the 6 schools participating in the project. Almost sixty percent (60%) of the children enrolled were medicaid eligible. A singular number of children, nineteen percent (19%), was neither covered by medicaid nor had private coverage. About all of the children in the target schools were on the free lunch program offered in the schools.

TABLE II

MEDICAID ELIGIBILITY

January 1980 - June 1982

	No. Enrolled	No. Medicaid	Percent Medicaid
Arlington	264	130	49.2
Lawlor	313	175	55.9
Leahy	489	243	49.6
Hennessey	526	368	70.0
Tarbox	387	252	65.1
TOTAL	1,979	1,168	59.0

Information not available for Leonard School.

August 1982

b) Student's School Assessment Form

Teachers were asked to complete this form which provided information on the child's school functioning. The assessment form included academic and behavioral questions. The form provided data which acted as a screening device for developmental concerns.

c) Physical Assessment

The information gathered through the health history, school records and student's assessment form provided the basic background information for the nurse practitioner when conducting the physical assessment. A Pediatric Nurse Practitioner (with support from the project's Pediatrician) performed the half-hour physical assessment with laboratory work done by a Medical Assistant or Medical Lab Associates (a local firm contracted for this service).

Table I shows the number of children screened by the Project. Eighty-eight (88%) percent of enrolled students were screened at least once. Two hundred and seven (207) students were screened a second time as required by the Project Good Health Periodicity Schedule.

The Lawrence Children's Health Project required space to perform physical examinations and the basic laboratory tests that are part of the direct health assessment. The initial intent was to utilize space within the Lawrence Public Schools, but in most cases every available room in the school buildings were being used and an alternative was required. A mobile van provided standardized space as well as site flexability. It could be moved from school to school.

During the Second Project year it was apparent that the Project was meeting a need within the schools. As it became accepted by school personnel, the project had an opportunity to test the use of a room within a school for screenings. The Project eventually phased out the medical van because of cost but it had been very helpful in getting the program started.

d) Developmental Assessment

The Nurse Practitioner reviewed the school assessment form, the physical exam and any parent concerns on the history and if concerns were evident, she recommended a Pediatric Elementary Examination (PEEX). This was a neuro-developmental assessment which was designed to elicit areas of developmental strengths or weaknesses for each child tested. Specific areas examined were:

- Temporal-Sequential Organization
- Visual-Spatial Orientation
- Auditory Language Function
- Fine Motor Function
- Gross Motor Function
- Short Term Memory

This assessment was given by the Project's Family Health Workers who had been trained by Children's Hospital.

3. Referrals

The Nurse Practitioner completed a Screening Summary Form. All positive findings from the Screening Summary required referral for diagnosis and possible treatment. Parents were given their choice of providers in the community. Developmental concerns were referred to the school system. Interpretation of the developmental assessment and suggestions for remediation were provided by the Projects's educational specialist or Pediatric Fellow.

Through the screening process, over 4,300 concerns were identified, or 2.0 concerns for each child screened.

Table III contains a listing of the major areas of concern identified through the screening and the frequency with which that particular area was identified. Table IV presents all concerns for students in each school.

TABLE III

MAJOR CONCERNS FOUND*

January 1980 - June 1982

	No. of Students With Concern	Percent of Students Screened N=2,117	Percent of Concerns Found N=4,337
Need Dentist or Dental Care	961	45.4	22.2
Need E.N.T. Specialist or has Hearing Concern	578	27.3	13.3
Need Immunization or Lacks Immunization Record	561	26.5	12.9
Need Primary Care M.D.	466	22.0	10.7
Growth or Nutrition Concern	332	15.7	7.7
Vision or Eye Concern	309	14.6	7.1

* Data on concerns found by the project are available on 2,117 out of 2,189 students screened or rescreened. A total of 4,337 concerns were identified or 2.0 concerns per screen (2.2 concerns per student with any concern; i.e., 164 students had no apparent concern.)

August 1982

TABLE IV

TOTAL NUMBER OF CONCERNS FOUND

January 1980 - June 1982

	Arlington N=219	Lawlor N=264	Leahy N=435	Leonard N=209	Hennessey N=575*	Tarbox N=415	TOTAL N=2,117
P.C.M.D.	58	46	95	45	107	115	466
DMD	129	130	217	97	157	231	961
ENT	28	61	48	53	59	50	299
Respiratory	3	3	15	9	12	16	58
Blood	4	--	--	5	5	3	17
Cardio-Vascular	8	15	54	7	6	19	109
Gastro-Intestinal	11	14	7	5	14	8	59
Genito-Urinary	28	14	36	14	57	25	174
Integument	14	18	33	12	37	25	139
Hearing	44	26	47	20	47	95	279
Vision & Eyes	31	28	61	26	71	92	309
Immunization	84	105	103	62	71	136	561
Neurological	1	4	3	--	16	9	33
Developmental	14	6	19	2	51	6	98
Muscular-Skeletal	12	18	28	23	38	61	180
Growth & Nutrition	29	43	94	43	75	48	332
Other	53	33	54	31	45	47	263
TOTAL	551	564	914	454	868	986	4,337
No Apparent Concern	17	12	59	20	35	21	164

* A total of 647 screens were completed at the Hennessey School. Data on concerns found were available for 575 of those.

August 1982

4. Follow-Up

The responsibility for follow-up was primarily that of the Family Health Worker assigned to the case. Once the referral had been made, it was important to assist the family in making and keeping appointments and arranging transportation and/or translation where necessary. In some cases, it was necessary to help families obtain third party assistance for payment to local providers. The Client Management Record and the Case Activity Record provided the structure to insure that follow-up was completed for each child.

The degree of follow-up was determined by a case conference between the Nurse Practitioner and the Family Health Worker assigned to the case. Three catagories of follow-up were used:

a. In need of immediate referral because of acute situation.

b. In need of referral because of positive finding, personal contact required.

c. In need of information or educational materials, ususally no personal contact necessary.

The educational materials developed or used by the Project were very helpful in easing the caseload. Workers could distribute information on lice control or on boosting iron intake through diet, etc. without reducing the time needed for personal contact for follow-up on (a) or (b).

Families with no problems identified through the screening were sent a letter indicating normal findings. A copy of the screening was also sent to the Primary Care Physician as well as to the child's school.

5. Client Flow

The chart on the following pages presents a summary of the client flow through the Project as previously discussed.

6. Training

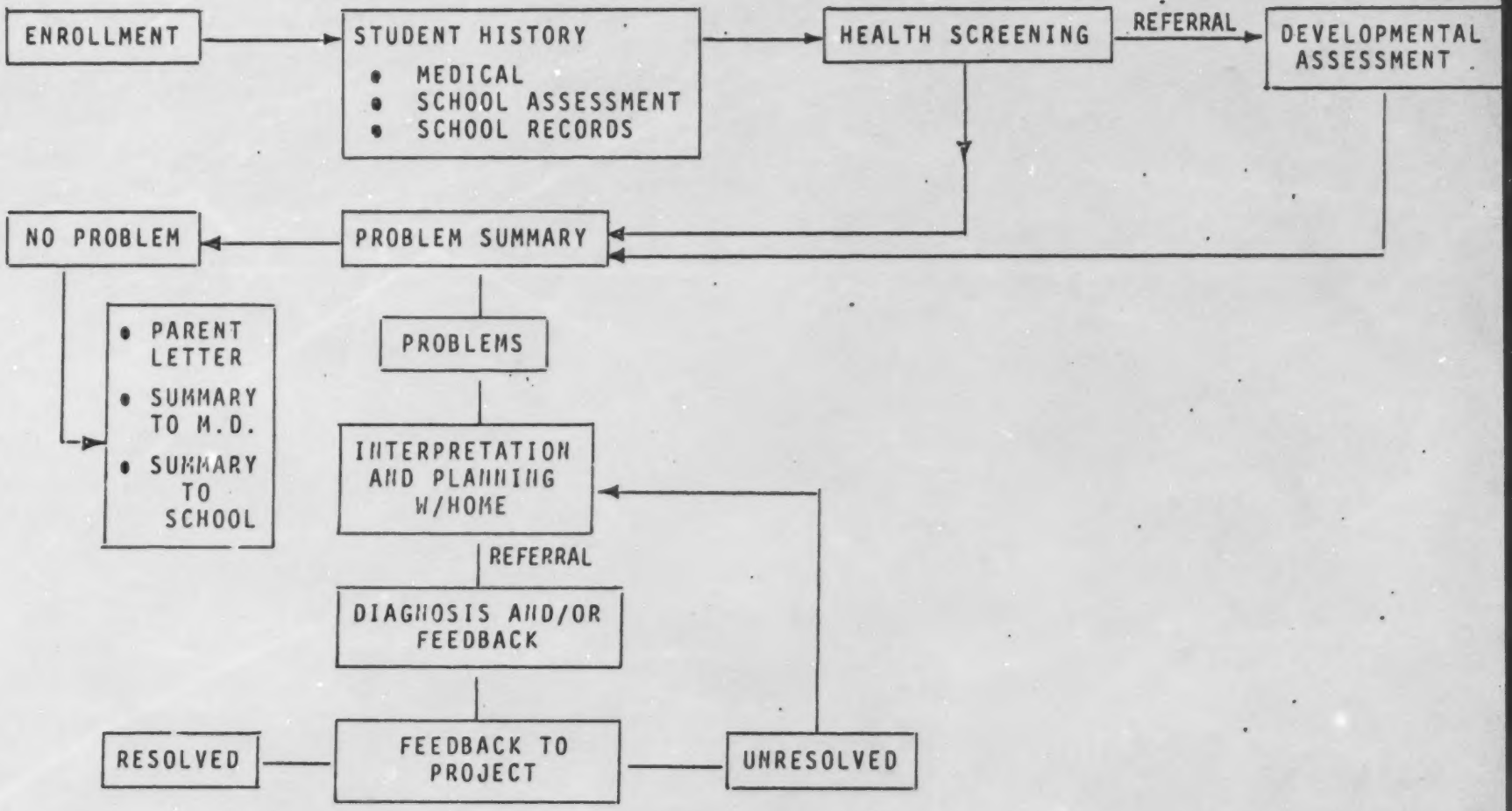
Beginning in January 1980, the Project conducted a number of awareness sessions for teachers and administrators of participating schools. At these workshops, the participants were introduced to key concepts relative to Early and Periodic Screening, Diagnosis and Treatment. They were made aware of the Project's philosophy and the relationship of school programs to children's health. In conjunction with this introductory session to the teachers, a similar session was conducted for the parents. Parents were introduced to the main elements of the program and the process which would be followed through screening and referral.

Subsequent parent workshops were conducted focusing on specific problems or needs of children who had been screened by the Project. Workshops were conducted for parents of children identified as having Sickle Cell Trait. Another workshop conducted in Spanish on High Blood Pressure was especially well received.

A continuing focus for training was the Project staff. A key objective for the training of personnel was to administer the developmental assessment instrument. A second important training goal was to provide the staff with awareness level knowledge in a variety of medical areas. Meeting biweekly, the staff dealt with such areas as:

- Basic Health Concepts
- Common Medical Procedures
- Childhood Illnesses and Treatment
- First Aid/Safety
- Health History - Purpose and Process

CLIENT FLOW


ENROLLMENT
STUDENT HISTORY
• MEDICAL
• SCHOOL ASSESSMENT
• SCHOOL RECORDS
HEALTH SCREENING
REFERRAL
DEVELOPMENTAL ASSESSMENT
NO PROBLEM
PROBLEM SUMMARY
• PARENT LETTER
• SUMMARY TO M.D.
• SUMMARY TO SCHOOL
PROBLEMS
INTERPRETATION AND PLANNING W/HOME
REFERRAL
DIAGNOSIS AND/OR FEEDBACK
RESOLVED
FEEDBACK TO PROJECT
UNRESOLVED

- Welfare and Other Assistance Programs
- Hispanic Culture Childcare Practices

With an elementary school administrator as the school system liason and with the support of a part-time research assistant, four Health Resource Units were developed and made available to elementary schools in Lawrence. These units included content materials to be used by the teacher in the classroom and instruction for the principal to assist him/her in the implementation process. The units covered the following topics:

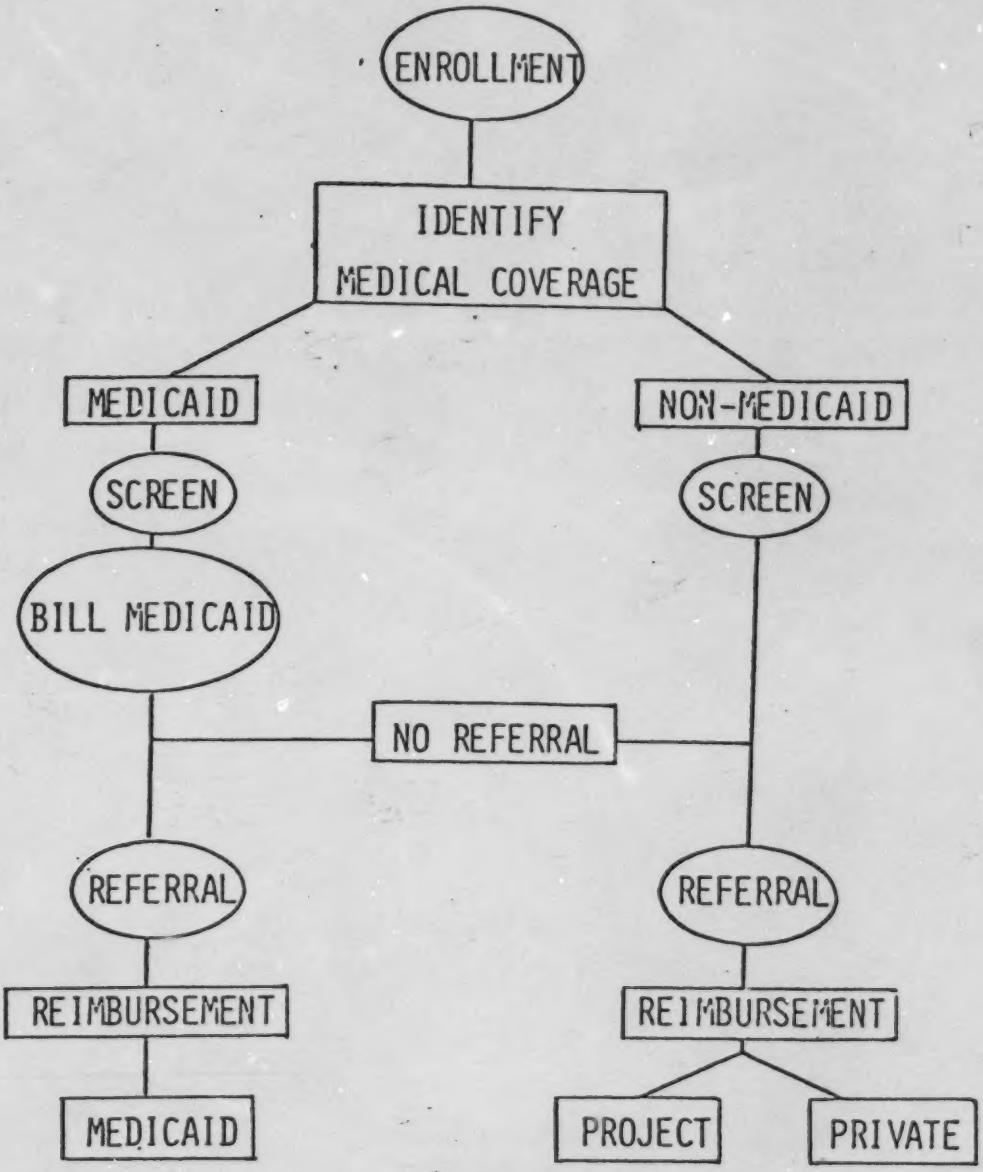
- Dental Care
- Hygiene
- Safety
- Nutrition

Attention was also given to developing awareness among children. Prior to the physical assessments, children were taken in small groups to the medical van or exam area and shown the equipment. They were also provided a short overview of the program in their school classroom. During each exam, the nurse practitioners conducted health education with each student

7. Billing

The Lawrence Children's Health Project/Merrimack Education Center is an "Alternate Provider" for the Massachusetts Department of Public Welfare (Medicaid) Project Good Health Program. The Project follows all applicable PGH/EPSDT guidelines for the screening of Medicaid children and the Project bills the Department for those screenings. Billing is based on the Department's standard fee schedule for Project Good Health providers.

LAWRENCE CHILDREN'S HEALTH PROJECT
BILLING COMPONENT



This particular type of provider, an alternate provider, was designed by the State Department of Public Welfare in order to expand the number of Project Good Health providers so that more children could be reached through the very important screening procedures. The following outlines the procedures used to identify children and to bill for Project services.

a) Identify Eligible Children

Intially, it was important to determine which children being served by the Project were Medicaid eligible. All parents who enrolled their children in the Project were interviewed for a Health History. At this point, all parents were asked questions regarding their financial coverage for medical care. Those who had Medicaid were asked for their Medicaid card so that proper information regarding names, addresses and Medicaid ID number could be recorded. State Medicaid forms were then placed in the child's folder.

b) Billing for Project Screening

For the first two years, once the children were screened by the Project's health and developmental team, the billing unit was notified by a Notice of Screening Completion Form. This form provided the appropriate information for completing Medicaid forms (Commonwealth of Massachusetts Form MA-7). The MA-7 form was completed depending on the actual services delivered to each child.

For the last three schools a new Medicaid form was introduced by the state. This form (MA-7P) required that the nurse practitioner complete a portion of the form and the billing unit completed the remainder.

c) Non-Medicaid Children

Not all children screened by the Project were eligible for Medicaid. The federal grant allowed the Project to screen these children at no cost to the parents. Some of those who were not on Medicaid could not afford

diagnostic and treatment services that were needed following the screening. The Project, therefore, developed a means test for using the Project funds for treatment of these selected non-Medicaid eligible children. This means test was based on the School Meals program; those who were eligible for the meals program and had no other source for medical care, were eligible to receive financial aid from the Project. Local providers billed the Project, using standard forms for these selected children. There was a limit of $250.00 for each child. The Project followed applicable Massachusetts Medicaid regulations when expending any Project funds for the non-Medicaid eligible children.

8. Management Information System

a) Introduction

Early in the formulation stages of the Project it was determined that a computerized information system would be desirable. The applications of this system include:

- Client Records
- Case Management (referrral/follow-up)
- Billing System
- Research Analyses
- Integrated Data Systems (Special education, health, etc.)

The Project reviewed available public domain systems on the belief that use of an existing software package would optimize limited funds as well as enhance dissemination capabilities. During the period December, 1979 - April, 1980, this review took place with the assistance of the Project's consultant, an expert in health information sysytems. This review suggested the COSTAR system as a very flexible system which could possibly match Project needs.

At this same time, the Project developed detailed specifications of its information needs. These specifications were compared to COSTAR. This further analysis indicated that COSTAR not only provided the medical record capacity, but appeared to allow for support of the all important case management aspects of the Project.

Later, primarily for cost reasons, the Project determined that a microcomputer system using the data-base management language dBASE II would be more appropriate. This micro system proved to be very helpful for the Case Management and Integrated Data Systems needs of the Project. It could also provide useful data for the needed Research Analyses. Some portions of Client Records were stored but the microcomputer system did not have the record capacity of COSTAR. Similarly, dBASE did not have a Billing system. This could, perhaps, be added. These two features were not crucial, however, because the Project's manual systems were adequate to meet the needs.

The following briefly outlines the two information systems tested by the Project. A separate report has been prepared which presents greater detail.

b) COSTAR Overview (minicomputer)

COSTAR (Computer-Stored Ambulatory Record) is a computer-based ambulatory information system which improves and expands upon the capabilities of a traditional medical record. Although use of the term "record" has historical precedence, COSTAR is more appropriately considered an information and communication SYSTEM designed to meet both the medical care and financial/administrative needs of either a fee-for-service or prepaid group practice.

The central objectives of COSTAR are to:

1. Facilitate patient care by improving the availability of medical information in terms of accessibility, timeliness of retrieval, legibility, and organization.

2. Enhance the financial viability of the medical practice by providing a comprehensive billing system with accompanying accounting reports.

3. Facilitate medical practice administration by providing the data retrieval and analysis capability required by management for day to day operation, budgeting, and planning.

4. Provide data processing support for administrative and ancillary services (e.g., scheduling, laboratories, and planning).

5. Provide the capability to generate standardized management reports and support user-specified inquiry and report-generation on any elements of the data based.

6. Support programs of quality assurance by monitoring the content of the data base according to user-specified rules and to report automaticaaly any deviations from these standards of care.

The Project entered into a time-share agreement initially with the Massachusetts State College System and then with a community health center to utilize a Digital PDP 11/40 computer.

A pilot test, using a small sample of children was completed in the summer of 1981. Encounter codes, procedures, report formats, and school information needs were reviewed and tested.

Following the test, long range plans showed that the cost of purchasing or leasing time on a mini-computer would be beyond the capablilities of the Project. Alternative arrangements, including joint purchasing of a mini-computer, were explored. By the fall of 1981, it was apparent that COSTAR was no longer the best alternative.

c) dBASE II Overview (microcomputer)

dBASE II is a data-base management language which operates in a CP/M environment on a microcomputer. The Project purchased an APPLE II Plus microcomputer for this system. The Project obtained over 5 million bytes

of storage space for data on students by purchasing a Corvus Hard Disk System.

dBASE II requires the following hardware and software environment:

- 8080, 8085 or Z-80 based microprocessor system (like the TRS-80/II, Northstar, Apple II with the Z-80 card, etc.)
- 48K bytes minimum of memory (dBASE II uses locations from 5CH to A400H) for most micros, 56K for Apple, Heath, Northstar and a few others.
- CP/M (version 1.4 or 2.x), CDOS OR CROMIX operating systems.
- One or more mass storage devices (usually floppy disk drives)
- A cursor-addressable CRT if full screen operations are to be used.
- Optional test printer (for some commands).

dBASE II Specifications

Records per database file	65535 max
Characters per record	1000 max
Field per record	32 max
Characters per field	254 max
Largest number	$+1.8 \times 10^{-63}$ approx
Smallest number	$+1 \times 10^{-63}$ approx
Numeric accuracy	10 digits
Character string length	254 characters max
Command line length	254 characters max
Report header length	254 characters max
Index key length	100 characters max
Expressions in SUM command	5 max

Appendix F presents a more detailed description of the microcomputer system.

9. Brokering

A major goal of the Project was to broker resources and services from existing providers to meet client needs. The Project completed a number of brokering activities.

a. Contracts and/or agreements with:

- Children's Hospital Medical Center: consultation; personnel, which included a pediatric nurse practitioner, a Pediatric Fellow (a pediatrician performing post residency training), and Developmental Assessment Training.

- Lawrence Medical Associates: lab tests and analysis.

- Education/Developmental Specialist: interpretation of screening results to school personnel, consultation, training, identification of successful practices.

- Boston City Hospital: (Sickle Cell Center) lab analysis, consultation, parent training and counseling.

- Bournival Plymouth: lease of mobile van used for screening activities.

- Management Information Systems Consultants: development of information specificatins, COSTAR modification, MIS system testing, BASE implementation.

- Massachusetts State College System and Harvard Street/Health Center: shared computer time to support the pilot of student health/school record system (MIS).

b. Referral of families to local providers:

- Twenty-seven area doctors and dentists accept referrals on a regular basis.
- Greater Lawrence Family Health Center.
- Bon Secours Hospital Pediatric Clinic.
- Lawrence General Hospital Speech, Hearing and Language Center

c. Cooperative agreements with Lawrence Public Schools:

- Provide medical and home assessments for certain special education evaluations.
- With the school nurse, up-date and follow-through on immunization requirements.
- Utilize school staff to acquire children's health history.
- Follow-through on health concerns identified through school vision and hearing screen.

Appendix E, Summary Report - Spring, 1982, and Appendix H, ABT Evaluation Report, discuss the Project's brokering concept further.

C. FUTURE PROJECT ACTIVITIES

The Lawrence Children's Health Project/EPSDT began delivering services in January, 1980. By June, 1982, over 2,000 Lawrence school children had benefitted from the Project. The ability to identify needs and to act as a broker to meet those needs was important to the successful demonstration of this school-based model.

This success has been recognized by the superintendent and the school committee in Lawrence and has, thus, led to support for future Project activities. The LCHP has completed its Federal demonstration grant and will continue under funding from state and local sources.

Appendix G is a copy of a letter of agreement between the Lawrence Public Schools and the Merrimack Education Center, Inc. This agreement provides for the continuation of the Project's EPSDT services and for the integration of those services with the school health program. The Project will thus provide the following services in the future:

- Complete health examinations
- Maintain school health records
- Determine immunization status
- Provide vision, hearing, and posture screens
- Supervise school nurses
- Follow-up on concerns with families

The demonstration grant was the catalyst to provide new and improved services to Lawrence school children. Those services have become an integral part of the Lawrence community.

III. MAJOR MILESTONES OF EACH PROJECT OBJECTIVE

A. INTRODUCTION

During the past three years the Lawrence Children's Health Project tested procedures, forms and delivery models to determine the most effective way of serving the children in the Lawrence Public Schools. Many milestones were reached during this period. All have been documented in quarterly reports previously submitted for FY1980 and FY1981.

Fiscal year 1980 witnessed the implementation of the Lawrence Children's Health Project/EPSDT. This implementation included the delivery of services to over 400 children in the first target school, the successful referral of children during that period, and the successful billing, by the Project, to the State Department of Public Welfare for Medicaid eligible children. This implementation demonstrated the ability of a school-based system to reach a high percentage of the target population and to successfully broker services. Agreements with the Children's Hospital Medical Center in Boston and the Lawrence Public Schools guaranteed the screening. Arrangements with local providers guaranteed resources for referral (though there still remained a lack of a sufficient number of primary care givers in Lawrence).

Fiscal year 1980 also saw the initial steps to integrate public school records with health records of the EPSDT project. This integration was particularly evident in the use by the project of School Health records for vision, hearing and immunization results. Integration also occurred for children who did poorly on the developmental assessment. They were referred into the Lawrence Public Schools for potential treatment of special education needs. Plans were developed for the use of a medical record software system known as COSTAR for storage of the records.

Fiscal year 1981 was the first full year of operation and therefore was the major year for demonstrating the effectiveness of this model for delivery of services. During the year, the Project was able to test procedures, forms and policies and make necessary revisions, so that by the end of the year the Project was on a firm basis for continued delivery of services.

Over 1000 children were screened in fiscal year 1981. This represented successful outreach through five schools and one day care center.

The Project tested the COSTAR computer system during fiscal year 1981 and early in fiscal year 1982 decided that a different system, using a microcomputer rather than a minicomputer, would be more appropriate.

Fiscal year 1982 began with more than the change in directions for the management information system. Based on the Project's prior experience, new forms were printed and proved very helpful in streamlining the history and screening process. Also, because the Project had a good record of service the school department agreed to have the Project supervise the school health staff which resulted, among other things, in the successful updating of immunizations at the high school which recently had been cited for 85% non-compliance with state regulations.

As the Project completed the period covered by the federal grant, plans had been made to remain in Lawrence with cash and in kind contributions from the school department as well as Medicaid billing as the source of income for FY83. Thus the Federal Project ended with not only a positive impact on the Lawrence school children (over 2000 screened) but also with a well established program capable of continuing to serve those children and their families.

The remainder of this Section discusses the Major Milestones for each objective. The milestones are listed by fiscal year.

B. BROKER MODEL

Objective 1: Design and implement a contracting brokering mechanism operating through a collaborative, that will interface local schools and medical service providers and promote cooperation to assure that EPSDT requirements are being satisfied.

1. FY 80 The Project successfully brokered for services from the nationally known Children's Hospital Medical Center, in Boston, to provide technical assistance as well as medical staff for the medical and developmental sceening in the city of Lawrence. The short supply of primary care providers in the Lawrence area, necessitated the brokering of services from outside the area in order to provide the required screening services.

2. FY 80 In addition to the need for medical services, there was a need for adequate space to provide screening. The schools did not have sufficient space within their walls. Although the success of the Project over time meant that principals were willing to find space, the initial need was met by leasing a medical van which was parked at the school each day for use by the screening team.

3. FY 80 In order to help support Project services and to eventually provide financial support following withdrawal of Project grant funds, the Merrimack Education Center/LCHP successfully contracted with the Department of Public Welfare as an alternative Project Good Health provider. This alternative EPSDT provider was the first and still is the only such provider in the State. This contract allowed for reinbursement for screening to Medicaid eligible children.

4. FY 80 Brokering for services occured following screening. Children with positive screening results were referred to local providers. The Project was successful in identifying providers who were willing to accept referrals and worked with those providers to obtain the best treatment services for Project children as well as to link children with sources of on-going care.

5. FY 81 It is significant that the major problems found by the Project were simply a lack of primary care: both dental and medical. The Project made many attempts to encourage parents to seek or to develop relationships with local primary care physicians and dentists. However, during the course of the second year, it became apparent that efforts to encourage parents to utilize these services could not be

as much a part of the Project as originally conceived. A significant amount of time and effort was required when working with parents. A case management program which includes a parent education effort based on one-to-one contact requires a large staff of case workers. Funding for this component in the future is not anticipated under Medicaid payments. While a search for funds continued, the Project staff began to spend more time with those families with serious or multiple problems. Thus, the staff were no longer able to work on a one-to-one basis with those families who required merely to establish a relationship with a local provider. (It should be noted that local providers initially were very receptive, however, as their own office practices became more crowded, they indicated that they would take fewer new patients unless those patients had specific problems. Therefore, increased efforts in the area of obtaining primary care physicians for children would not be beneficial because of the lack of available resources).

6. FY 81 The Project had originally hired a medical assistant who provided laboratory assistance for the nurse practitioner working on the medical van. When the Project staff expanded to include a second nurse practitioner it became apparent that the staffing costs would be too high if another medical assistant were hired. Therefore, the Project contracted with a local laboratory to provide services. When the medical assistant resigned the position in June, 1981, the local laboratory became the source of laboratory services (hematocrit and urinalysis) for all screening sites. (The Project maintained active relationships with a local agency for lead screening and with the Boston Sickle Cell Center for testing and counseling.) The laboratory sent a technician to the school to obtain samples from 50-80 children. The results were returned to the Project the next day for inclusion in the child's record. This became a very effective means of assuring that children in the Project obtained the necessary laboratory work. This process allowed for control as well as timely processing of the information received. The Project was able to bill Medicaid and was thus able to cover the cost of the laboratory contract with the local laboratory.

7. FY 81 The Project applied to the State for direct reimbursement for Developmental Assessments. This was requested to allow this important part of the Project to continue beyond the end of the federal grant. Because the State was willing to recognize that Developmental Assessments should be reimbursed as a separate diagnostic test beyond the initial screening, the Project received approval of the application under State EPSDT guidelines in early FY 1982.

8. FY 81 Another major activity for the Project which proved to be of long range benefit to the health of Lawrence school children began in the fourth quarter of fiscal year 1981. The Project submitted a proposal to the Lawrence Public Schools which provided for the Project to oversee the school health program in the city of Lawrence. Responsibility remained with the school department but the superintendent and school committee agreed to allow the Project to supervise school nurses and school vision and hearing testers in order to establish a coordinated system. As the school year began in September, 1981, this caused an increase in the work load of Project management, but was seen as an important feature for the continued operation of the school health and screening program. Eventually, the school nurses could be retrained to become effective case managers for outreach and referral. Time of these nurses will be made available as the Project frees the school nurses from their paperwork, relating primarily to immunizations and to vision and hearing screening. This arrangement for supervision was successful in fiscal year 1982 and has provided the school department with enough evidence to merit funding for the next school year. This places the Project in an excellent position to coordinate EPSDT and school health services and to continue to broker for services to meet the needs of children.

9. FY 82 As part of the responsibilities assumed by the Project in coordinating the school health program it was necessary to make sure that all state regulations were being met. This was accomplished through review of the regulations, a series of meeting with state representatives, and a concerted effort to organize a program which had had no coordinator for several years. This included the submission of waiver request to the state in order to allow the Lawrence school health program to be more flexible in meeting the needs of its students.

C. SERVICE DELIVERY

Objective 2: Provide access to special education, health, and ancillary services, through a school initiated, single intake, evaluation and case management sysytem, for all children in the Project area.

1. FY 80 In order to guarantee access to services, the Project first designed special outreach, screening, referral and follow-up procedures. These procedures and the necessary forms to collect information at each stage of the process, were developed in the first quarter of fiscal year 1980.

Over time, procedures were revised to reflect the on-going operations of the Project. However, the revisions were minor and the Project's outreach, screening, and referral services were extremely successful in enrolling and tracking children. At the first school, 77% of the students were enrolled (70% of those were Medicaid eligible).

2. FY 80 The Project applied for and received a waiver from the federal regulations in order to provide medical services to children who are not Medicaid eligible. This was found necessary because of the need to guarantee services for problems found as a result of the screening. Children who did not have Medicaid or who had no insurance coverage (or limited coverage) would not have been able to access medical services in the community for necessary diagnostic and treatment services. As reported to the Health Care Financing Administration, on January 2, 1980 the Project designed a means test based on the existing criteria used by all schools to determine eligibility for the meals program. This means test allowed families within a range of income (between the Medicaid eligibility level and the upper level for the reduced meals program) to obtain support through the Project for their children.

3. FY 80 In January, 1980, the Project began its outreach efforts with a parent meeting in the first school, the Hennessey School in North Lawrence. This meeting was designed to reach as many parents as possible in order to enroll children in the Project. This meeting and subsequent enrollment activities marked the beginning of service delivery for the Lawrence Children's Health Project.

4. FY 80 Following enrollment, screening services began in February of 1980. These screening services continued throughout the year following procedures previously devised. At the initial school, 338 children were enrolled (77%). Of these children 237 (70%) were determined Medicaid eligible. Thus, a high percentage of the target population was enrolled. A high percentage of those enrolled and screened were Medicaid children, who, most likely, would not have received EPSDT services without the Lawrence Children's Health Project reaching them through the Lawrence Public Schools.

5. FY 80 During the Summer of 1980, the Project provided screening to children in the Hennessey School neighborhood. Seventy-two (72) siblings of children previously screened at the Hennessey School, were screened during the Summer. This demonstrated the feasibility of using the neighborhood school as a base for reaching pre-school children. The screening services for these pre-school children were

similar to those used during the school year, with the exception that younger children required a different developmental assessment.

6. FY 80 — In September, 1980, the last month of the fiscal year 1980, the Project began operations at a second school, the Tarbox School in the Arlington district of Lawrence. This school was very different from the Hennessey School. The physical plant was much older and in poor repair. The neighborhood was also very different. These factors in combination with the need to establish relationships with new school staff presented some problems for initiation of Project services. However, service delivery was successful and enrollment continued to increase as the Project became better known in the neighborhood.

7. FY 81 — During fiscal year 1981, the Project learned that there were families who were not enrolling their children in the Project. It was important to determine why this was occuring. Other than the fact that some parents already had primary care for their children, the major reason for not enrolling was a lack of interest on the part of the parents. The Project thus began a special outreach effort to enroll children who had been reluctant to enroll. These efforts required the use of health history takers - bilingual, indigenous workers, many of whom were teachers in the schools where screening occured. These history takers were responsible for contacting the parents of children not enrolled as a result of the Project's meetings and letters. This extra outreach effort was successful in enrolling more children and reached children who often needed more attention than those enrolled through other means. The success of the outreach effort was apparent immediately. At the Tarbox School, the intial enrollment had reached 79% of the children in the school. By the time the Project had completed screening at that school, a total of 90% (50 additional children) were enrolled. Those 50 children averaged 3.1 problems per child, compared to 1.6 problems for the whole population at that school. Had the Project not reached these children with a higher prevalence of problems, they would not have enrolled on their own and would likely not have obtained access to medical services in the community. The Project incorporated these outreach efforts into its regular activities, in order to make sure that the maximum number of children in need of the service were identified, enrolled and screened. Less emphasis was placed on open meetings which tended to be poorly attended. Letters from principals and Project staff continued to be an effective way of reaching a large number of children.

8. FY 81 Experience during the previous year allowed the Project to test the use of one nurse practitioner at one Project school. During fiscal year 1981, the Project was able to expand to two full time equivalent nurse practitioners. (There were three nurses, each working part time). This expansion was necessary in order to allow for an increased volume in billing to Medicaid to sustain the Project in the future; and to provide staff to do the rescreenings that are required under the State Medicaid periodicity schedule. It was projected that with this increase in staff, the project can screen 2,500-3,000 children per year. Further increasing the number of nurse practitioners is not practical because of the inability to provide support services, that is, case workers. There is virtually no funding available for case work staff.

9. FY 81 With increased staff, the Project was able to screen children in five schools during fiscal year 1981. In addition, the Project screened children at a local day care center during the summer of 1981 as an experiment to show that the Project could expand to sites other than public schools. During the year, there were a total of 1,502 children screened. A total of 2,339 problems were found. The Project did have significant success in referring and helping families to obtain services in the Lawrence area within a reasonable amount of time. Referrals were arranged not only for problems that required immediate attention but for those which required further diagnostic or treatment services.

0. FY 81 Because of the large number of problems found and because of the need to standardize referral decisions between three nurse practitioners, the Project developed criteria for referral which were used to assist nurse practitioners and case workers to determine the immediacy of referrals. These criteria helped the practitioners to categorize cases for the Project case workers. In addition, the Project had criteria which were used by nurse practitioners for each physical exam that they did which helped them to clarify any questions they might have regarding the status of each child.

11. FY 81 A major portion of the Project was the Developmental Assessment. In the first year the Project had one individual assigned to do Developmental Assessments of all children in the initial school. When the Project moved to the second school, it became more desirable to have case workers share the developmental testing. This allowed each tester more flexibility and prevented burnout. It also allowed case workers to become better acquainted with the children and therefore better able to handle any referrals that may result not only from the developmental but also

from the physical exam. The Project developed a teacher evaluation form (revised to become the student school assessment form). This form was completed by all teachers in each school. It helped to clarify the developmental status of each child and indicated delays which may exist. The results allowed for prioritization of students and the high priority students were tested using the neurodevelopmental exam originated by Children's Hospital Medical Center. The results of the develpomental exam were analyzed and reviewed with teachers by Project staff. The focus of the Develomental Assessment was to provide information on the develomental status of the child (strengths and weaknesses) to the school personnel so that they could assist the child in the learning process. Review of the effectiveness of the student's school assessment form was conducted by the project's Pediatric Fellow. This review included a comparison of the actual results of the Developmental Assessment and the results of the teacher completed evaluation form. This review indicated that the student's school assessment form completed by teachers was effective as a screening tool to identify those children who did have developmental delays and therefore who did need a Develpmental Assessment.

12. FY 82 When the Project was given responsibility for supervision of the Lawrence School Health Program there was an immediate need to upgrade the records and immunization status of the students at the high school. The State Department of Public Health cited the high school as having 85% of the 1500 students non-immunized. The Project did not usually give immunizations. It relied on local physicians and the city health department clinic. However, to meet the need at the high school the Project first requested that students obtain shots on their own. After a couple of months it was apparent that not all were doing this. Thus, on February 3 and 4, 1982 the Project ran an immunization clinic in the high school library. Over 300 students were immunized and the high schol is now near compliance.

13. FY 82 The Project prepared a School Health Policy Guide for Lawrence Public Schools. This became the guide required under state law for all schools. Appendix D contains a copy of the Guide.

14. FY 82 Finally, the Project completed screening at several schools begun in FY81, initiated and completed screening at another school, and did rescreeening at still another. This was a positive note for ending the Federal Grant period. Please see Section II. B. for a summary of data on children screened for the entire Project period.

D. MIS

Objective 3: To design and implement a management information system for (a) case management records, and (b) billing procedures.

1. FY 80 As part of the procedures developed by the Project, forms were designed for case management of all children enrolled in the Project. The necessary forms and procedures proved successful in keeping track of each child. As the number of children grew it became more and more important that the Project implement it's computerized management information system. So, during the second quarter of fiscal year 1980, the Project identified the existence of the COSTAR information sysytem and began investigating the possibilities of using that system for Project needs. That system was within the public domain, and provided a flexible medical records system. In order to demonstrate the capabilities of COSTAR, the Project contracted with the Institute for Educational Services/MITRE Corporation. This contract allowed for a brief demonstration of COSTAR so that the Project could become more familiar with this system. That demonstration was successful and showed the interactive, flexible nature of COSTAR to be a very positive feature. Near the end of fiscal year 1980, the Project made the decision to implement a COSTAR system in the City of Lawrence. The Project successfully demonstrated COSTAR for fifty (50) children from the Hennessey School under the contract with IES/MITRE. At the same time, negotiations began for obtaining the software and hardware necessary for the Project to implement the COSTAR system. However, the Project year ended prior to the final decision regarding equipment for the support of COSTAR. (This decision was subsequently made in favor of a Digital Electronics Corporation PDP-11/23 computer with necessary peripheral equipment).

2. FY 80 At about the same time the procedures were established for case management, it was necessary to design the system for billing. This was developed and proved successful for keeping track of medical eligibilities as well as for obtaining reimbursement from the State Medicaid office for screening of Medicaid eligible children. It did not appear that either the volume or the complexity of the billing by the Project required a computerized billing system.

3. FY 80 In order to obtain some interim statistical data on the children being served through the Project, the decision was made to computerize some data while awaiting implementation of COSTAR. A local statistical corporation was contracted

to provide SPSS analysis of data on fifty (50) children from the Hennessey School. Following the entry and analysis of those 50 children, more data became available. By the Fall of 1980, data was compiled on 195 children from the Hennessey School.

4. FY 80 In the fourth quarter of fiscal year 1980, the Project made a presentation to the State Institutional Review Board at which time, it was determined that no human subjects participating in the Project were at risk and confidentially was protected within the Project's record system. This was so reported to the Health Care Financing Administration according to Protection of Human Subjects' Regulations.

5. FY 81 To implement the Projects COSTAR management information system, two important services were brokered into Lawrence. The first was the services of a consultant with knowledge of COSTAR and of the MUMPS language in which COSTAR is based. During the year, these consultants provided important technical services to the Project. The second need was for computer hardware. The Project was able to contract for time on a digital PDP11/40 at the Commonwealth Center, a multiserrvice center of the Massachusetts State College System in Wellesley, Massachusetts. However, in July the Project learned that the Center would be closing. This required finding another location with the appropriate hardware/software configuration. This was done with minimal loss of time by obtaining services from a Neighborhood Health Center in Boston. The Hardware at that location allowed the Project to load COSTAR software and to enter data and access that data via telephone connection from Lawrence. Availability of computer hardware allowed the Project to enter records during the summer of 1981. Data on Project children were entered as an experimental test of the data entry capabilities and of the design of forms for the Project. Forms were revised to make sure that data was easily entered from them as original source documents. COSTAR codes data to allow an extremely flexible data entry system. Unfortunately, it was found that the data was not as accessible as desired. During the summer of 1981 standard COSTAR output reports were tested. These were not flexible enough to provide Lawrence Children's Health Project data needs. The redesign of these reports would be a major programming task. However, the Massachusetts General Hospital Laboratory of Computer Sciences (which created COSTAR) did have a revised report generating capability called Medical Query Language. It was anticipated that this language would be available in the fall of 1981 and would be incorporated into the version of COSTAR which the Project was using. When available, the

MQL was tested for its capacity to provide the necessary reports. Some technical problems prevented a successful test. In addition to the problems that the Project had with generating the necessary reports from COSTAR the cost of a minicomputer, such as the Digital 11/40, was determined to be an investment that the Project did not wish to make. In addition, it became apparent by the end of fiscal year 1981 that the Project, in the long term, could not afford the operation of COSTAR. It was estimated that a minimal expenditure of $20,000 per year is required for the operation of this system. The Project had adequate procedures for collecting data and retrieval of data if it was of a clinical nature and pertinent to individual children. However, if COSTAR were not operational, the Project would not have the important capability for more effective management of the system. Thus, plans were made at the end of the fiscal year to obtain a microcomputer system which would cost under $10,000 and have minimal on-going costs. This dual paper/computer system (that is, paper for clinical reports and billing and a computerized management record) was the best approach for long-range needs in Lawrence.

6. FY 82

With some financial assistance from the Massachusetts Department of Public Health, the Project designed the microcomputer system and began data entry in January, 1982. The system uses a data base management language called dBASE II which provides several standard entry and retrieval formats. This language is available commercially and is operated by the Project on an Apple II Plus micro with a Corvus System hard disc drive with a 5.7 megabyte storage capacity.

This system is described in greater detail in a separate report (Appendix F).

E. TRAINING

Objective 4: Design and implement a comprehensive education program for children, parents, local school principals, physicians, and related medical health professionals and others involed in the demonstration to inform them about the goals and operation of the Project; to instruct them regarding their individual roles in the proposed system; and to educate them regarding health care.

1. FY 80 The initial activities of training and education under the Project necessarily focused on the needs of the Project to get services operational. The first training milestone occurred in December of 1979. This was an orientation for teachers at the Hennessey School. This orientation informed teachers, the school nurse, and other school personnel of the intent of the Project and their role in helping to obtain screening and treatment services for children at the Hennessey School. The orientation was repeated at other schools as the Project moved to new neighborhoods.

2. FY 80 Other training and educational activities focused on the needs of the Project staff. Staff were trained in the methods of giving the Health History; selected staff were trained to do Devlopmental Assessments; some staff received training in Physical Examination and Lab Work; and there were general staff training sessions as well. Some of the staff training took place in Lawrence while sessions took place at Children's Hospital Medical Center in Boston.

3. FY 80 Following the initial stages of the Project, plans were formulated for the training of teachers. This became more necessary as the results of the Developmental testing were reviewed. Workshops, groups and other activities were held.

4. FY 80 Because of the number of children who were having difficulty on the developmental test (approximately one-third of the children needed followup), the Project decided to utilize a consultant/developmental specialist. She worked with teachers on an individual child basis and assisted them in developing classroom situations to meet the needs of these individual children. Over time this roll was assumed by the Project's Pediatric Fellow because funds were not available for continued support of the specialist.

5. FY 80 As the Project staff became more and more aware of the problems of the children and families in Lawrence, an inservice training schedule was planned for the Fall and Winter of the school year 1981. This training was helpful to staff in their work with parents as well as their overall knowledge of health and community agencies.

6. FY 80 Based on the results at the Hennessey School, it became apparent that certain areas, such as nutrition and sickle cell disease needed some extra educational input. In some cases, the Project arranged for individual counseling for parents regarding the causes and treatment of sickle cell. In other situations, such as nutrition, the Project formulated plans to devlop educational packages for each

school. These resource packages were developed and are discussed below. In addition, a nutritionist worked with the Hennessey School staff in June, 1980 and children were referred to the Extended Food and Nutrition Program of the County Extension Service.

7. FY 81 — As the Project screening proceeded, it was determined that children lacked some important knowledge of health. Educational activites therefore were determined as an important means of intervening to prevent future health problems. Therefore, the Project contracted with a local teacher to develop a package of instructional material for Lawrence Public School teachers to use for instuction on personal and dental hygiene. A second package on nutrition and a third on safety were also indicated as needed. The design of these health packages was completed during the fiscal year and were tested by teachers at the Leahy School in the 1981-1982 school year. Following the successful testing of these materials, it is anticipated that the school department will reproduce them and distribute them system wide for use in the health education programs of the schools.

8. FY 81 — During the course of the year, the Project developed and supplied a great deal of information to parents either verbally or in writing regarding specific problems their children might have. Topics such as lice, earwax or obesity were covered and became an important source of information for parents and staff.

9. FY 82 — A manual on Developmental Assessment was developed by Children's Hospital Medical Center for the Project. This manual was intended for teachers, to aid them in better implementing recommendations from the Project's Developmental Assessments.

10. FY 82 — In response to the need seen by the Project for more information for parents about local resources, the Project developed a resource manual for parents of young children, birth to five years old. With a small grant from the Massachusetts Department of Education, Early Childhood Project, this pamphlet was written in both Spanish and English. Appendix B contains a copy of this pamphlet.

F. EVALUATION & DISSEMINATION

Objective 5: Evaluate the effectiveness of the Project and disseminate the results of the evaluation along with other Project materials, throughout Massachusetts and the Nation.

1. FY 80 During the second quarter of fiscal year 1980, the Merrimack Education Center signed a contract with the Educational Testing Service of Princeton, New Jersey (Wellesley, Massachusetts office), to provide the evaluation of the Project. This contract provided for evaluation of the Project during fiscal year 1980.

The first interim report from Educational Testing Service was made available to the Health Care Financing Administration with the Progress Report for the second quarter of fiscal year 1980.

2. FY 80 Dissemination of Project documents and initial dissemination of the results of the Project occured during fiscal year 1980. Numerous state and local groups in Massachusetts, as well as several from other states, spoke with Project staff and visited Project offices. The dissemination did include a presentation at a meeting of school and health representatives from throughout New England. This meeting was sponsered by the Department of Health and Human Services, Health Care Finance Administration, Region 1, Boston and the Region 1 Department of Education. The Lawrence Children's Health Project/EPSDT was a major presentor at the conference.

3. FY 81 The Project contracted with three separate evaluation consultants during fiscal year 1981 to evaluate the various components of the Project. One consultant evaluated brokering; another analyzed the Project's service delivery (EPSDT); and a third reviewed the training and educational portions of the Project. One of these, ABT Associates, required specific data of a clinical nature on the Project children. During the spring and summer of 1981, the Project supplied information on over 900 children to ABT for purposes of computer analysis. The other two consultants, MAGI and Educational Service Group, interviewed Project staff, local providers and collected other information in Lawrence. These three organizations provided interim evaluation reports in the spring of 1981 and provided final evaluation reports in October of 1981.

In general, the reports were very favorable toward the Project and indicated the feasibility of using this brokering delivery system for the Early and Periodic Screening, Diagnosis and Treatment program.

4. FY 82 Several dissemination activities occured in fiscal year 1982. In the fall of 1981 Merrimack Education Center staff attended a dissemination meeting in Texas and gave a presentation. Several groups visited the Project including a group of students from the Harvard School of Public

Health, groups from various state agencies, and representatives from the State of Connecticut who are planning to implement a similar program statewide. In addition, phone calls and letters were answered.

5. FY 82 — To more efficiently discribe the Project and its philosophy a synchronized slide tape show was prepared. This presents in a nicely prepared visual and sound show, the components of the Project. In the words of Project staff, parents, and the school superintendent the show describes the benefits of the Project. This slide/tape show has already been helpful in the dissemination of the Project concept by its use at area meetings.

6. FY 82 — The evaluation of the final federal Project year was prepared by ABT Associates, Inc. of Cambridge, Massachusetts. This report is referred to as Appendix H and is included under separate cover.

IV. FINANCIAL STATEMENT

LAWRENCE CHILDREN'S HEALTH PROJECT

FINANCIAL STATEMENT

September 30, 1982

		BUDGET	EXPENDITURES	TOTAL
PERSONNEL				
200-3-1	Project Director	20,000.00	20,000.00	-0-
200-3-2	Services Coordinator	15,643.00	15,643.63	1.37
200-3-3	Planning/Billing	20,735.00	20,727.18	7.82
200-3-5	Family Health Worker	10,047.00	10,046.91	.09
200-3-6	Family Health Worker	9,278.00	9,277.21	.79
200-3-7	Family Health Worker	9,555.00	9,551.09	3.91
200-3-10	Secretary	7,470.00	7,464.41	5.59
200-3-15	Nurse Practioner	10,200.00	10,200.00	-0-
FRINGE BENEFITS				
200-3-17	Fringe Benefits	13.536.02	12,815.90	720.12
NON LOCAL TRAVEL				
200-5-1	Non-Local Travel	528.50	528.50	-0-
EQUIPMENT				
200-6-1	Equipment	-0-	-0-	-0-
SUPPLIES				
200-7-1	Office Supplies	2,800.00	3,103.15	(303.15)
CONTRACTUAL				
200-8-1	Evaluation	20,000.00	20,557.75	(557.75)
200-8-2	Evaluation Coordinator	5,000.00	5,000.00	-0-
200-8-3	Pediactric Fellow	18,300.00	18,300.00	-0-
	Computer Consultant	1,700.00	1,700.00	-0-
OTHER				
200-9-1	Rent & Utilities	7,635.00	7,702.23	(67.23)
200-9-2	Local Travel	2,870.00	2,810.29	59.71
200-9-3	Telephone	3,000.00	3,011.89	(11.89)
200-9-4	Duplicating	2,063.00	2,045.36	17.64
200-9-11	Printing	2,073.68	1,823.68	250.00
INDIRECT COST		18,192.00	18,233.93	(51.93)
TOTAL		200,613.20	200,543.11	75.09

From September 30, 1981 to September 29, 1982

V. APPENDICES

APPENDIX A

LIST OF MAJOR PRODUCTS AND REPORTS

LIST OF MAJOR PRODUCTS AND REPORTS

In addition to regular quarterly snd end-of-year reports to the Health Care Finance Administration, the Project prepared or used the following major products and reports.

A. Health History and Direct Health Assessment

Health History Form

- Direct Health Assessment Form (DHA)
- Physical Exam Form (revision of DHA)
- Direct Health Assessment Referral Criteria

Developmental Assessment Form

- Applicability of Neuro-Developmental Examination
- Student's School Assessment Form (SSAF)
- Analysis of Developmental Screening Tool (SSAF)

C. Management Information System

- Work Process Charts
- COSTAR V computer system overview
- Documentation of COSTAR V
- Documentation for APPLE, Corvus, dBASE and related microcomputer systems
- LCHP Management Information System Final Report

D. Organization

- Project Organization Chart
- Project Steering Committee List
- Lawrence Children's Health Project/Lawrence Public Schools: Proposal (for future school health services)

E. Billing System

- Application to the Department of Public Welfare to be a Project Good Health Provider January 2, 1980 Report to HCFA regarding Means Test used by the the Project
- Billing Component Description
- Summary of Financial Coverage for Project Children
- Proposal to Receive Reimbursement for Developmental Assessments

F. Training

- Topical Health Packages description
- Topical Health Packages - Sample
- Teacher Orientation Booklet
- Inservice education Program Outline

G. Reports

- Summary Report: January, 1980 - March, 1981
- Interim Evaluation Report: May, 1981
- Final Evaluation Report: FY 1981
- Summary Report: FY 1981

APPENDIX B

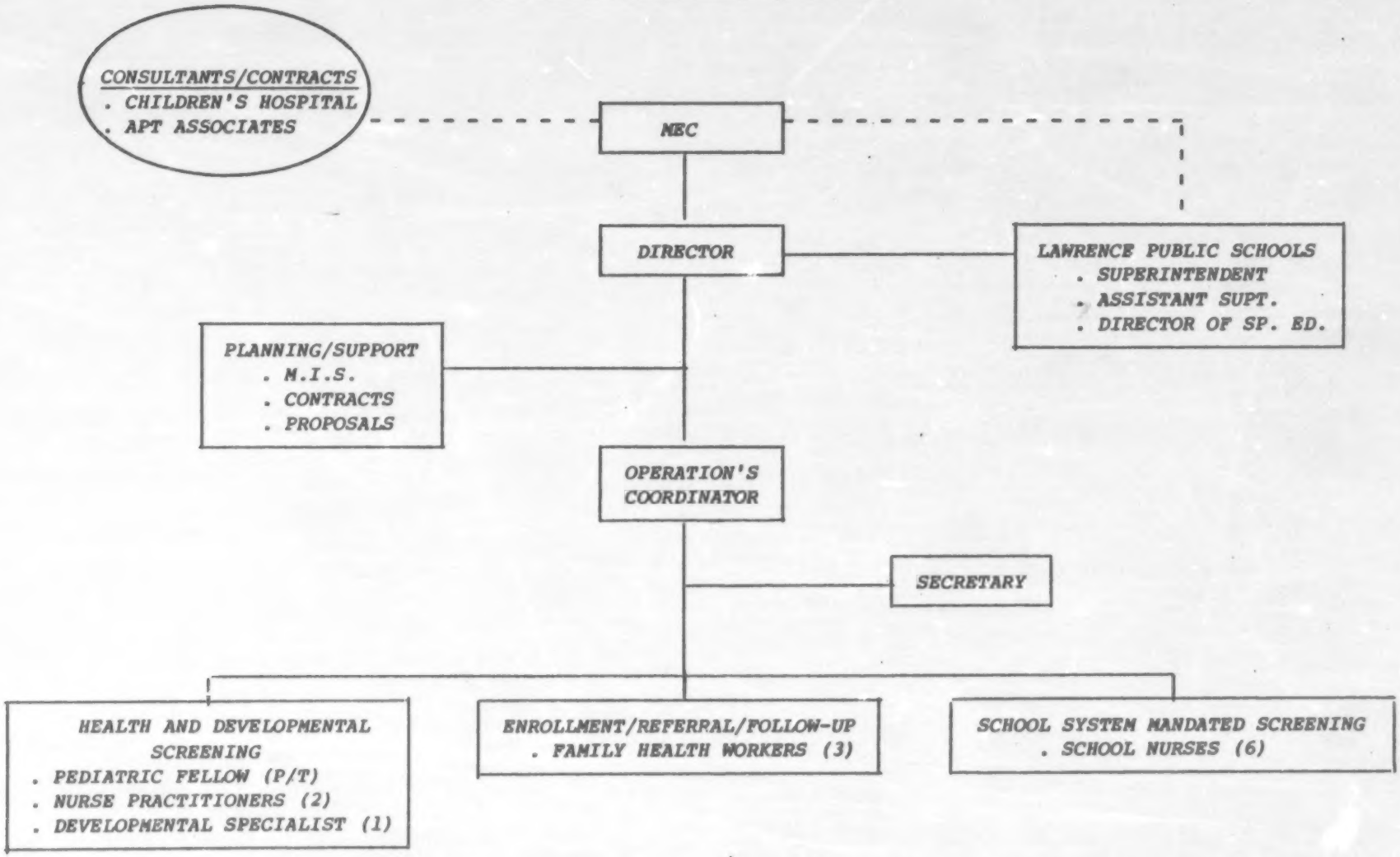
EARLY CHILDHOOD PAMPHLET (ENGLISH/SPANISH)

APPENDIX C

- ORGANIZATION CHART

OCTOBER, 1981

LAWRENCE CHILDREN'S HEALTH PROJECT



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APPENDIX D

SCHOOL HEALTH POLICY GUIDE

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SCHOOL HEALTH POLICY GUIDE

The information contained in this School Health Policy Guide is based on the Laws of the Commonwealth of Massachusetts, the Regulations of the Lawrence Board of Health, and the Rules and Regulations of the Lawrence School Committee.

The school health services in the Lawrence Public Schools are organized to protect pupil health and to enable each individual to reach and maintain the highest possible state of well-being. The four important aspects of the school health services are:

A. Determination of health needs
B. Follow-up and interpretation
C. Care of emergency sickness and injury
D. Prevention and control of disease

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A. DETERMINATION OF HEALTH NEEDS

In order to meet the educational and health needs of children and youth, it is essential to secure information concerning their physical, mental, and emotional condition, past and present. Such information may be obtained in part from parents and pupils; other sources may be from observation and screening by school personnel and examinations by professional personnel - either private practitioners or individuals employed by the school or health departments.

1. Continuous Observation by Teachers

Good teachers are skilled observers of children because they understand the way children and youth grow and develop and because they recognize that the health of pupils affects their ability to participate in the school program. Teachers are in a strategic position to note changes in appearance and behavior that are indicative of changes in health status. Semmingly insignificant observations sometime lead to the discovery of serious conditions which were previously undetected.

2. Screening Tests

Certain health needs may be identified by screening tests. These tests are carried out by teachers and technicians under the general supervision of the school physicians, school nurses, or coordinators of the particular health field. Screening tests used are those for

measuring growth and for determining quality of vision and hearing. Screening procedures are only a means of reaching specific goals and these goals can only be achieved by appropriate follow-up.

3. Health Records

These records should be accumulative. An approved form for assembling the accumulated data and opinions about a child's health is an essential part of the school's file of information gained from parents, teacher observations, screening tests, physical examinations, recommendations by physicians, dental reports, and all other facts which have a bearing on the child's health . This record becomes a history of the child's health on which all interpretations can be based. It serves as the focal point on which all communications between teacher, physician, dentist, optometrist and nurse are centered. It should , therefore, be cumulative from grade to grade and follow the child from school to school as does the scholastic record.

B. FOLLOW-UP AND INTERPRETATION

Efforts to help children secure treatment or other needed attention for health problems, identified by the procedures described in the previous section, are a most important aspect of the school health services. Without such efforts, the identification of health problems is of little value. Follow-up requires proper interpretation of health conditions to pupils, parents, teachers, and administrators. The school nurse has the responsibility for this phase of the school health program.

1. Interpretation to Pupils

As a part of the school health service each pupil should be acquainted with the meaning and importance of his/her health record. The interpretation should be presented in such a manner that will cause the pupil to change faulty habits and practices, seek correction of remedial defects or handicaps, and overcome unhealthy personal states such as malnutrition. A pupil should know when he/she needs medical care and why.

2. Interpretation to Parents

Parents should be acquainted with the health needs of their children as revealed by the school health records in order to seek needed medical care, plan changes in diet, make alterations in daily routines, and take any other steps which are necessary for improving health.

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[illegible] the teacher or the school nurse to explain the need for such care. Parents can, and should obtain the services of qualified professional individuals from local medical or dental agencies.

Parents should be invited to come to the school at least once a year to discuss their child's needs with the teachers, school physician, or school nurse. If the parents are unable to come to the school, the school nurse should arrange a visit to the home in order to interpret the urgent health needs of pupils.

3. Interpretation to Teachers

Teachers should be kept fully informed of the health status of the pupils in the school. The school nurse, working in close cooperation with the school physician, pupils, and parents, is well qualified to do this work. It is also desirable to schedule teacher-nurse conferences at regular intervals.

C. CARE OF EMERGENCY SICKNESS AND INJURY

The school is responsible for the administration of emergency care. Emergency care is limited to first aid only.

The school is not responsible for treatment, therefore, school policies does not permit school personnel to treat or to prescribe treatment. All medical treatment, even the administration of such a simple remedy as aspirin, is considered outside the province of school responsibility.

Financial arrangement for treatment and aftercare is not the responsibility of the school. This is the responsibility of the family.

School personnel are legally and personally responsible for the general welfare of school children during the school day. Because the school is responsible for emergency care, a written plan forsuch care has been developed. The plan is based on specific policies and provides an outline of procedures for carrying out these policies.

PLAN FOR HANDLING EMERGENCIES

The plan for the emergency handling of accidents and illness will reflect those areas of responsibility which the school has in respect to:

a. Giving emergency care that will protect the life of students.
b. Notifying the student's family.

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c. Arranging transportation for the student. Only in emergencies should the school provide transportation.

d. Guiding parents to sources of treatment when necessary.

e. Maintaining emergency notification cards.

f. Recording the nature and circumstances of the accident or illness for which emergency care was provided.

g. Making available to everyone, telephone list of Physicians, Hospitals, Poison Center, Fire and Police Departments, Ambulance Service, Taxi Service and other Rescue or First Aid Service.

EMERGENCY CARE

Emergency care is limited to first aid only.

First aid as defined by the American National Red Cross, is the immediate and temporary care given in case of accident or sudden illness.

It includes only those procedures that can be applied by non-medical persons to save life, to prevent further injury or to reduce suffering.

It does not include diagnosis or medical treatment.

The principal should indicate those on the school staff who have the necessary understanding to administer first aid.

First aid instructions, attached should be available in all first aid cabinets and distributed to all school personnel. These should be reviewed annually.

TRANSPORTATION

Parent or responsible person must be contacted, depending upon best procedure, before pupil will be dismissed to be taken home. If parent cannot be contacted, other relative, friend, police or responsible person must be designated. When sutdent, traveling alone, with car, reaches his/her destination, parent should be asked to call the school whe he/she arrives.

If a pupil suffers an injury or is ill to a degree that the person in authority is concerned about the well-being of the pupil he or she (school nurse, principal, or the teacher in charge) is authorized to arrange the pupils transportation to the nearest hospital immediately.

RECORDING AND REPORTING IN EMERGENCY CARE

The school should maintain two types of records in respect to emergency care: Emergence notification cards and case records.

1. Emergency notification cards for every pupil should be kept up to date and be accessible to all school personnel. These cards should designate the physician or physicians and hospital to be called in the event that the parent or designee cannot be reached.

2. Brief case records of injuries and illness requiring first aid should be maintained. This record may include the following information:

   a. The nature and extent of injury
   b. The first aid given and by whom
   c. Date, time and place; how it happened and witnesses
   d. Parent notification
   e. Transportation supplies

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STANDING ORDERS

These Standing Orders, approved by the school/city physicians, are intended to be a guide for all. The procedures contained herein are not to be carried out except as emergency measures and only until contact has been made with the family. Adaptations of these Standing Orders may be made to meet emergency situations involving pupils while under school supervision.

Standing Orders for emergency treatment are to be kept in the Office of the School and a copy should be available to all school personnel at all times.

ROUTINE CARE OF PUPIL PATIENTS

Reassure pupil. Have pupil rest on chair or bed if necessary. Phone parent if condition warrants. Clean and dress all wounds except compound fractures and severe bruises, which are to be covered with sterile dressing unitl examined by a physician.

ABDOMINAL INJURY

Keep patient warm and lying flat. Notify parent. Secure prompt medical care. Do not give anything to drink.

ABDOMINAL PAIN

There are many causes and some may be serious. Give nothing to eat or drink. Take temperature. Contact parent and adivise medical care if fever or very severe pain. Frequent complaints should be called to parents attention and investigated.

ASPHYXIATION

Remove victim to open air. Administer mouth to mouth resuscitation. Have someone dial operator and order fire department resuscitator.

BACK INJURY

Keep warm and comfortable. Do not move unless absolutely necessary. Use ambulance or litter transportation to nearest hospital. Notify parent.

BLEEDING (Severe) HEMORRHAGE

1. Severe Bleeding from Wound - Apply gauze and pressure immediately over wound until bleeding stops. Reinforce dressing and secure in place. Notify parent, transport to hospital. Do not use tourniquet.

2. Internal Bleeding - Keep patient warm and lying down. Notify parent. Transport by ambulance to hospital.

BURNS

1. Minor: Immerse in cold water until pain is relieved. Apply vaseline or bland ointment.

2. Severe: Cover with dry dressings. Do Not Apply Any Type Of Ointment. Notify parent. Transport to hospital.

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DIABETIC COMA

Give no treatment. Transport to hospital. Notify parent.

DISCHARGING EARS (Ear Infection)

Wipe discharge from outer ear only. Do not insert cotton. Do not irrigate. Urge medical care. Exclude from swimming pool. If chronic or recurrent, check with observation of the teacher, arrange for individual audiometer test, and then advise proper medical supervision.

DISLOCATION

Do not attempt to put back in place. Secure affected part in comfortable position with sling or splint. Notify parent. Transport to hospital.

DROWNING

Give mouth to mouth resuscitation. Keep victim flat and cover for warmth. Dial operator for resuscitator from fire department. Notify parents and secure medical care.

EARACHE

Give no treatment. Emphasize the importance of medical care.

ELECTRIC SHOCK

Do not touch victim until source of current is located and turned off. Use a "non-conductor" (long wooden stick, no metal) to remove wire from contact with victim. Give mouth to mouth breathing. Get medical help. Have someone dial operator for fire department resuscitator. Transport to hospital. Notify parents.

FOREIGN BODY IN: EAR, NOSE, THROAT

Give no treatment. Call parent and urge immediate medical attention. If signs of respiratory distress, take to nearest hospital at once.

CHEMICAL BURNS OF THE EYE

Irrigate eye copiously and continually with lukewarm water. Transport to hospital.

FOREIGN BODY IN: EYE

If foreign body is easily located and not imbedded, remove with cotton-tipped applicator dipped in clean tap water. If imbedded and not easily removed, close eye, apply dressing, and refer to a physician. Discuss possibility of injury to the cornea if eye is rubbed.

EYE INJURIES

Cover eye and secure prompt medical care. Transport to hospital.

FAINTING

Keep person lying flat until full recovery. Loosen clothing at neck and waist. Use ammonia inhalant sparingly. Give nothing by mouth. Notify parent. If person fails to respond in a short period, secure prompt medical care.

FRACTURE

1. Simple Fracture - Keep person warm and in a comfortable position. Apply cold pack over painful area. Be careful not to move injured parts in a manner that would cause further injury. Notify parent. Transport to hospital.

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a. Immobilize affected part with splint or sling

b. If leg injury, avoid weight bearing

c. If back injury, use ambulance

2. Compound Fracture - Control severe bleeding with direct pressure, otherwise, do not disturb wounded area. Cover with sterile dressing. Have patient lying down. Cover for warmth. Notify parents. Transport to hospital.

HEADACHE

Take temperature. If fever, advise medical attention. Recommend rest and quiet. Cold compresses may be applied to the head.

HEAD INJURY

Put victim down flat. Apply cold compress to burised area. Transport to hospital if there is: nausea, vomitting, irregular pulse, irregular pupils, drowsiness, twitching, unconsciousness, bleeding from ears or mouth. Notify parent.

INFLAMED OR DISCHARGING EYE

If acute and discharging, recommend exclusion from school and urge immediate attention by family physician or medical clinic. Advise against mascara and eye liner when eyes are irritated. If chronic, check with observations of teacher, eye inspection, and vision testing/record - advise proper medical supervision.

INSULIN SHOCK

Give some form of sugar such as a lump of sugar, a piece of candy, or sweetened fruit juice. Transport to hospital. Notify parent.

NECK INJURY

Cover patient with blanket. Do not move him/her. (Danger of further injury). Notify parent. Transport to hospital by ambulance.

NOSEBLEED

Seat person in comfortable upright position with head forward. Apply cold compress over the nose. Using gauze squares or tissues, clamp both nostrils closed. Advise not to blow nose for remainder of day. If severe, secure medical care. Notify parent.

SEIZURE (Convulsion)

Keep calm. Do not restrain movements. Do not try to force anything into mouth. Place a pillow or other soft material under head for protection, moving furniture away etc. Loosen tight clothing. Turn person's head to one side to allow saliva to run out of mouth. After movements cease, may be transported to health room where he/she should be allowed to rest until completely recovered. Notify parent. If very prolonged (10 or more minutes or convulsion is repeated secure medical care). Advise medical attention following a first convulsion.

SHOCK OR COLLAPSE

Keep the person flat. Keep warm. Transport to hospital. Notify parent.

[illegible]

Minor skin infections may be treated locally at the discretion of the school physician or nurse. All other skin disorders are to be referred to the family physician. A written certificate from the family physician will be required of all those referred in order to permit their return to the classroom.

SKIN INFECTIONS

Recommend exclusion from school except when infection is very limited or when the area can be adequately covered or when the pupil is under the care of the family physician. Urge medical care for extensive or severe cases of suspected impetigo. If parent cannot secure the services of a private physician, help him/her to secure medical attention through community services.

TOOTHACHE

Advise dental attention.

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UPPER RESPIRATORY INFECTION, COLDS, SORE THROATS

Recommend that pupil be excluded from school when found with elevated temperature and any of the following symptoms: discharging eyes, cough, sore throat, earache, headache, or general malaise. Advise medical attention and instruct parent.

MINOR ACCIDENTS AND INJURIES

a. Abrasion Scratches, Simple Lacerations - Control bleeding. Cleanse with antiseptic soap and or aqueous zephiran.

b. Bee Stings - Remove stinger. Apply cold compress or ice. Watch for allergic reactions, hives, shock, difficulty in breathing. If any of these signs or symptoms appear, transport to hospital. Notify parent.

c. Bites - Animal Bites: Wash area thoroughly with soap and irrigate will with water. Notify parent and advise medical care. Board of Health and Lawrence Police must also be notified.

- Insect Bites: Use baking soda paste to relieve itching. If swelling becomes extensive notify parent and advise medical care.

d. Bruises - Apply cold compress to newly acquired bruise. Old bruises: No treatment.

e. Contusion - Apply ice or cold compress to affected area.

f. Infected Wounds - Contact parent and advise medical care. DO NOT TREAT.

g. Old Injury - Apply frest bandage if needed. Advise parent regarding needed care and medical attention. Emphasize proper care at home.

h. Laceration - Minor: Wash with antiseptic soap and water. Apply antiseptic and dry sterile dressing.

Severe: Use gauze dressing and pressure over wound to stop bleeding. Reinforce and secure dressing in place. Notify parent. Transport to hospital.

i. Pulled Ligaments - Refer to family physician. Give no local treatment.

j. Deep Puncture Stab - Cleanse with Betadine. Apply tincture of Zephiran. Loosely bandage.

k. Poison Ivy - Poison Oak - Exclude from school if lesions are oozing or widespread. If extensive contact parent and advise medical care. Exclude from swimming pool and showers.

l. Puncture Wound - Wash well, allow to bleed freely. Apply dry dressing. Refer to family physician for toxoid injection.

m. Sprain or Strain - Advise keeping affected part immobilized and elevated until medical care can be secured. Apply ice or cold compresses. Sprains are not to be splinted, taped or strapped. Contact parent and advise medical care.

n. Splinters - Wash with soap and water. If easily accessible remove gently with tweezers. If deep, do not attempt to remove. Contact parent. Advise medical care and tetanus protection.

o. Tooth Injury - Chipped or fractured tooth: Notify parent and advise prompt dental care.

- Permanent Tooth Knocked Out: Notify parent and send student immediately to dentist. Wrap the tooth in a wet compress (salt solution) and send it along to dentist.

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Students

[illegible] Discrimination, Rights and Reports to Students

I Parents' Responsibilities

Parents should be encouraged to arrange for medication or drugs to be administered [illegible] children outside the school day. However, [illegible] in the [illegible] public schools that such medication will be given, the procedures described below are to be in effect.

Parents should be encouraged to visit the school, daily, to administer the medication.

II Authorized Personnel

In the event that parents cannot perform this task, the following personnel are authorized to administer medication to students within the conditions stipulated below:

School Nurse
School Principal
Any Professional Staff Member

III Conditions Within Which Medication Can Be Administered

There must be written, dated authorization to the Principal from the parent or guardian of the child. Such authorization must be renewed annually as needed.

There must be written directions to the Principal from a licensed physician. This request is to be attached to the authorization from the parent and kept in a file under the control of the Principal of the school. Copies of the directions and authorization should also be kept on file by the School Nurse and the Superintendent of Schools.

The medication to be administered should be kept in a labeled container bearing the name of the child and the name of the medication. This container should be kept under lock and key, with the key to be controlled by the Principal of the school.

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Page 4

Administering Prescription Medicines and Drugs to Students

III Conditions Within Which Medication Can Be Administered (continued)

Parents will be required to bring the medication to school and should not send the medication with their children.

A record of administering such drug or medication to a child will be kept. Said drug or medication should be administered before a witness. The record should indicate the date, time, place and medication given, and should be signed by the person who administered the drug or medication as well as the witness to the administering.

IV Medications Administered By Injection

The same general conditions will exist with the addition of the following:

Exhibit A will be signed by the parent.

Appropriate personnel will be trained by the prescribing physician.

V Indemnification

Personnel authorized by the Superintendent of Schools to administer such medication as described in this regulation, will be indemnified by the City of Lawrence against personal liability during the period of time that such authorization will be in effect.
Ref: Chapter 258 - Mass. General Laws

VI The Use of Psychotropic Drugs

No person shall administer, or cause to be administered, to any pupil in the Lawrence Public Schools, any psychotropic drugs named on the enclosed list which has been established by the Massachusetts Department of Public Health, except under the following conditions:

A. The school must have obtained certification by the Commissioner of Public Health, or his designee, that the administration of such drugs in school is a legitimate medical need of the pupil.

Students

VI The Use of Psychotropic Drugs (continued)

B. The administration of such duly approved medication shall be carried out only by a registered nurse or a licensed physician.

Att: List of Psychotropic Drugs

Ref: Chapter 71, Section 54B
General Laws of Massachusetts
Chapter 71, Sec. 54A"...No public school teacher, principal, or nurse who, in good faith, renders emergency first aid or transportation to a student who has become injured or incapacitated in a public school building or on the grounds thereof shall be liable in a suit for damages as a result of his acts or omissions either for such first aid or as a result of providing emergency transportation to a place of safety, nor shall he be liable to a hospital for its expenses if under such emergency conditions he causes the admission of such injured or incapacitated student, nor shall he be subject to any disciplinary action by the school committee for such emergency first aid or transportation. Added by St. 1938, c. 265, Sec. 3; amended by St. 1973, c.660."

REGULATION
APPROVED:

LAWRENCE PUBLIC SCHOOLS
LAWRENCE, MASSACHUSETTS

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RELEASE

We, _____, husband and wife, both of _____ Lawrence, Essex County, Massachusetts are the (parents, guardians) of _____.
Name of Student

We are fully aware that our son - daughter has been treating at _____ for a problem of _____

_____

_____

_____

We have read the attached medical statement dated _____ from _____ concerning our (son's - daughter's) medical condition. We further state that we fully realize the seriousness of _____'s condition.

Because we want our (son - daughter) to be able to attend school regularly in the Lawrence Public Schools, and because of the above-mentioned medical problem, we are authorizing the following school personnel to administer the necessary medication (which we will supply to the school) to our (son - daughter) as deemed necessary.

_____

_____

_____

_____

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NOW THEREFORE We, the said_____

for ourselves and our (son - daughter) hereby agree to hold harmless and free from all liability for any injuries or damages which may result from any act or omission to act on the part of any of the individuals authorized by us to administer medication to _____, or any substitute or alternate for said duly named individuals.

We also further agree that none of the above-named individuals or their alternates or substitutes shall be liable in a civil suit for damages as a result of any act or omission, on his or her part, in administering or failing to administer medication to_____.

Signed and Sealed this_____ day of_____, 19

_____
Parent or Guardian

Witnessed by:

_____ _____
Parent or Guardian

COMMONWEALTH OF MASSACHUSETTS

ESSEX, ss. _____
Date

Then personally appeared the above-named_____

_____, and having read the within Release and attached report from_____ acknowledged the foregoing instrument to be their free act and deed before me.

_____
Notary Public

My Commission Expires: _____

List of Psychotropic Drugs

The following are hereby determined to be psychotropic drugs under the provisions of M.G.L. c. 71, s. 54D:

(1) Acetophenazine
(2) Amitriptyline
(3) Amobarbital
(4) Amphetamine
(5) Aprobarbital
(6) Barbital
(7) Benactyzine
(8) Butabarbital
(9) Butaperazine
(10) Carbromal
(11) Carphenazine
(12) Chloramepate
(13) Chlordiazepoxide
(14) Chlormezanone
(15) Chlorpromazine
(16) Chlorprothixene
(17) Deanol
(18) Desipramine
(19) Dextro-Amphetamine
(20) Diazepam
(21) Doxepine
(22) Fluphenazine
(23) Flurazepam
(24) Haloperidol
(25) Hydroxyzine
(26) Imipramine
(27) Isocarboxazid
(28) Lithium
(29) Meprobamate
(30) Mesoridazine
(31) Methaqualone
(32) Methylphenidate
(33) Nortriptyline
(34) Oxazepam
(35) Pentobarbital
(36) Perphenazine
(37) Phenaglycodol
(38) Phenelzine
(39) Piperacetazine
(40) Pipradol
(41) Probarbital
(42) Prochlorperazine
(43) Promazine
(44) Protriptyline
(45) Secobarbital
(46) Talbutal
(47) Thioridazine
(48) Thiothixene
(49) Tranylcypromine
(50) Trifluoperazine
(51) Triflupromazine
(52) Tybamate

This list includes the drugs and other substances listed above, by whatever official name, common or usual name, chemical name, or brand name designated.

All isomers, esters, ethers, salt and any combination of drugs and other substances listed above are deemed to be subject psychotropic drugs.

The Department shall annually review the list in 5.1 and 5.2. The Commissioner, in accordance with the provisions of M.G.L. c. 30A, may, at any time after giving due public notice, make revisions in the list, either by the deletion or addition of a drug or drugs.

The Department shall maintain a current list of the psychotropic drugs which the F.D.A. has approved for use in children. This list shall be available to the public upon written request to: Division of Family Health Services, Department of Public Health, 39 Boylston Street, Boston, Massachusetts 02116.

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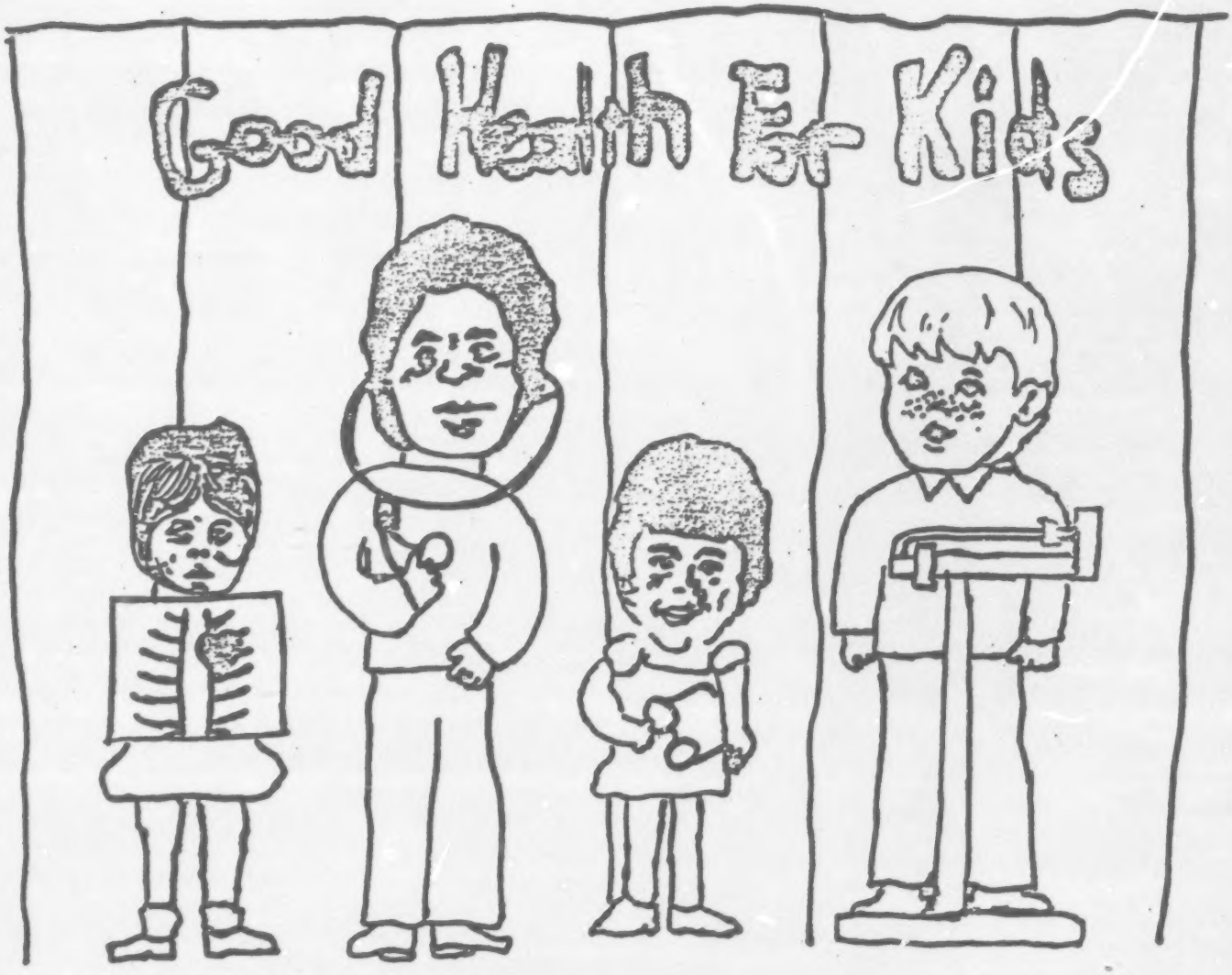
APPENDIX E

SUMMARY REPORT - SPRING 1982

Lawrence Children's Health Project



SPRING 1982
SUMMARY REPORT

Lawrence Children's Health Project, Early Periodic Screening, Diagnosis and Treatment.

Merrimack Education Center

TABLE OF CONTENTS

	Page
PREFACE	ii
A CASE STUDY	1
COMPREHENSIVE SERVICES FOR NEEDY CHILDREN	1
INTERAGENCY COLLABORATION	7
A PHILOSOPHY OF BROKERING--SHARED RESPONSIBILITY	7
THE BROKERING STRATEGY	12
CLIENT PATHWAYS FOR CASE MANAGEMENT	19
SIGNIFICANT FINDINGS	22
SUMMARY	25
FUTURE DIRECTIONS	25
POLICY IMPLICATIONS	26

PREFACE

This report describes an alternative method for the delivery of health services to low-income children in the City of Lawrence, Massachusetts. The record of the Lawrence Children's Health Project (LCHP), as it assesses progress and prepares to apply what it has learned, is worthy of attention. Those with deep concerns for providing essential health care for all children will be encouraged. Public persons struggling to orchestrate a confusing array of resources and responsibilites for the benefit of children will see progress. Educators will find the promise brighter for bringing together diverse sources of support for their classroom efforts.

In light of the need for effectiveness and cost-efficiency, the reader will find in this project and its progress a timely approach to some severe cost and budget pressures. One of the distinguishing features of the LCHP is the utilization of an organizational collaborative model for delivery of comprehensive EPSDT services. Funded by the Health Care Financing Administration, the project involves the active and formal collaboration of the Massachusetts Department of Public Welfare, the Lawrence Public School District, Boston Children's Hospital Medical Center, and the Merrimack Education Center. Through the collaborative, there is better use of resources, cost savings and more local as well as better health care for all children. Results thus far as well as the opportunities for improvement provide a basis for a new look at the role of collaboration at the local level. Dialog among parties at interest and comments may encourage further explorations of this approach to the delivery of social services. Comments will surely aid in the continuing effort as improvements are introduced and tested during the next project year, 1982-1983.

The promise of the program described here stems from a major effort to develop an effective means of making mandated comprehensive health and special educational services available to children in Lawrence. This effort sought to overcome barriers posed by overlapping federal and state laws, regulations and programs for welfare recipients under age 21--children with handicapping conditions and school age children in general. The approach taken was that of "brokering" or managed sharing and coordination of resources--a model for enhancing the educational resources of school districts that had been tested and refined by the Merrimack Education Center. Thus, the LCHP is an ongoing extension of local coordination and sharing with a fifteen year history.

More detailed reports can be found in the evaluation study for 1980-1981, detailed sets of data, analyses and observations are presented in the Final Evaluation Report including:

- *Health-related activities*
- *Training of participants*
- *Educational activities*
- *Collaborative and brokering mechanisms*

Background information on the history of the project is provided in the Final Report along with a summary of the issues and problems the project set out to address. Each of the three evaluation sections has its own set of conclusions and action recommendations.

Principal Evaluative Results

The evaluation reports can be requested from the Merrimack Education Center along with the appendix which contains the forms and questionnaires used by the evaluating firms. Significant evaluative results are included here in summary form:

- *90 percent of the target population of children has been reached by the program--a significant accomplishment in light of comparable levels of 5 percent elsewhere.*

- *Service was more comprehensive in terms of compliance with legal requirements and the integration of usually fragmented services--a definite qualitative gain.*

- *Brokering succeeded in better utilization of resources--gains in efficiency and more complete mobilization of available capabilities. The potential for substantial cost savings is now evident.*

- *Some practices and mechanisms may be applied elsewhere--some features of the project are well enough understood to be introduced and tested elsewhere.*

OUR NATION'S CHILDREN FROM LOW INCOME FAMILIES

Over the years Project Hope has brought a ship, the U.S.S. Hope, with a team of U.S. doctors and nurses to needy ports-of-call all over the world. The past three years Project Good Health has brought a medical van with a pediatrician and a registered nurse practitioner from Children's Hospital, Boston together with countless other services, bringing hope to a few thousand youngsters from low-income families in urban Lawrence, Massachusetts.

A CASE STUDY

This paper is intended to describe in the first part how the Lawrence Children's Health Project became organized through a brokering strategy which implemented interagency collaboration. The second section will specify the elements of this Early and Periodic Screening, Diagnosis and Treatment (EPSDT) Program as delivered in Lawrence, analyzing this case from the viewpoint of delivery of services to the client. Benefits and constraints will be detailed. Valuable experience having policy implications for delivery of health and human services in Massachusetts and in the nation will be drawn for due consideration by policy-makers and legislators.

COMPREHENSIVE SERVICES FOR NEEDY CHILDREN

As the Lawrence case is studied, some major principles become evident. One such standard is the effort made by Project Good Health to provide comprehensive services for needy children. This project exemplifies one of the more advanced models of the holistic delivery of such services. Emphasis is placed throughout on the cost-effective integration of services rendered to clients. This approach focuses on the child as a "total" individual, rather than viewing the youngster as the recipient of a string

of unrelated services in the areas of health, education and social services. This integrating concept seems to produce a more humane and humanizing delivery system more worthy of the name "human services".

A HOLISTIC VIEW OF THE CLIENT

While targeting on the individual child and his or her total development as a person, the Lawrence Children's Health Project addresses a basic problem often prevalent in such service delivery systems. In this Project the individual is treated within the context of the family unit. The fact that this school-based model originates in the school establishes a more direct tie with the family unit to which the youngster belongs. In this case the school becomes a vital link in brokering health and social services to the individual and his family.

THE BOTTOM LINE--IMPROVING QUALITY WHILE CONTAINING COST

Rather than delivering a series of fragmented services to the children served, the case managers who are family health workers in this Project perceive each child as a unified person whose health and social services needs interact with his educational growth and development. Rather than sorting out and fracturing these different parts of each person's world, as has too often been the problem in the past, this Project attempts to capture the synergy generated when all the parts are related to the whole person. Through this process, Project Good Health addresses a major issue of economics and effective treatment--how to improve the quality of health care services, maximizing the impact of the client and his environment, within professionally acceptable limits of cost containment.

EARLY INTERVENTION = PREVENTIVE MEDICINE

In the past decade since the Federal Government enacted enabling legistation facilitating the establishment of health maintenance organizations (HMOs), there has been an increasing emphasis placed by many health

practitioners on preventive medicine. Whatever the future of this development, it should be placed on record that the Lawrence Health Project is in the vanguard of such constructive efforts. Early intervention, even involving pre-school screening, identification and treatment, is an essential component of this school-based model. This practice of early and periodic screening results in diagnosis and prescribed treatment before undue complications have been compounded. It also facilitates follow-through and follow-up as the child's medical records become part of his or her school medical history which is being continually integrated with educational and social service delivery records as the child progresses through the system.

A PRO-ACTIVE SCHOOL HEALTH DELIVERY SYSTEM

All too often a school health program misses the mark by not being integrated into the delivery of services to the school children the district serves. As a result, too often these services are scheduled for funding cutbacks in a Massachusetts Proposition 2½ atmosphere of cutting down on all but "essential" services. In the Lawrence Children's Health Project, not only has the role of school health services in assisting the children's full development been heightened, but the Project has brought a plethora of community resources to bear upon the total health needs of the pre-school and elementary school children in the City of Lawrence. Rather than going through routine procedures and being available for limited emergencies, this system's health services staff has now bought into the EPDST Program and is considerably more pro-active in relating to the health needs of the district's students in the context of the total educational environment.

FEDERAL AND STATE MANDATES

Both Federal and State laws passed by legislators in the '70s call for expansion in both the number and types of services available to the students.

These added legal responsibilities, in addition to other requirements being placed on schools by varied segments of society, are being absorbed at a time that funding support is being withdrawn or threatened by erosion.

Under Title XIX of the Social Security Act, the Federal-State Medicaid program makes early health care available to eligible children in low income families from birth to the age of 21. Both the Health Care Financing Administration and the U.S. Department of Education are charged with seeing to it that school-aged children from low-income families receive the health services available through Early and Periodic Screening, Diagnosis and Treatment (EPSDT). It is also critical to the Lawrence case analysis to note that a joint statement by these two Federal agencies specifies their joint intent to provide access to EPSDT services through schools wherever possible.

At the State level, the Department of Public Welfare, which is responsible for implementing the Federal EPSDT guidelines contained in Title XIX of the Social Security Act, encourages school districts to join as partners with EPSDT in locating and referring children to appropriate health services. In principle the school-based model is accepted as the primary vehicle for getting these services off the ground and delivered to those in real need of them. But how is this theory being translated into practice? This Lawrence case study will help answer this question.

SPOTLIGHT ON THE HANDICAPPED

But before the organizational structures which form the Lawrence Project are examined in this case analysis, one other important piece must be added to this puzzle. Both Federal (P.L. 94-142) and Massachusetts (Acts of 1972-Chapter 766) laws require that a broad range of health, educational and social services be provided by or through the schools as they help assess and

treat the wide range of disabilities and handicaps among their clientele.

Research demonstrates repeatedly that the incidence of such problems is more prevalent among children from low-income families. Urban school districts are especially caught in this Catch-22 situation by being required to do more with less. They must seek a solution which maximizes the resources they already have and which brings to bear the multitude of community resources that can be effectively integrated. The Lawrence case points up how the early identification of health problems can improve the health of children and their performance in school. In the Lawrence elementary schools, for example, the Individual Educational Plan (IEP) required by law for youngsters with handicaps has been enhanced and made quite effective through the integration of Early and Periodic Screening, Diagnosis and Treatment (EPSDT) in the program required for each such youngster.

PROJECT GOOD HEALTH

A major purpose of EPSDT is to identify as early as possible children's health and developmental problems. The Federal government, working through the Department of Public Welfare, addresses the health needs of school children, especially those in low-income groups. This Federal program is entitled Project Good Health in Massachusetts. Among the unique features of Project Good Health as it is working in the City of Lawrence is the manner in which it improves the availability and accessibility of primary health care of high quality for children in need. This effective program includes single intake through the school, case management by family health workers and follow-up on a regular basis managed through a computerized information system.

NECESSITY THE MOTHER OF INVENTION

In view of the dilemma it faced with tax caps and the impact of Proposition 2½, the City of Lawrence, through its School Committee, made

a critical decision in the case under examination. Recognizing their responsibility under Federal and State law to comply with provisions requiring extended services to students in need, they wisely enlisted the assistance of the Merrimack Education Center, Chelmsford, Massachusetts to broker these services. Since its founding in 1967 the Merrimack Education Center (MEC) has served Lawrence as one of the 22 school districts with 100,000 students in the Merrimack Valley which now comprise its membership. MEC proposed for the Lawrence elementary schools a brokering strategy to coordinate health and special educational services from 1979 through 1981. This proposal was accepted and the program is still in operation.

Experience in the early years of implementing provisions of legislation for the handicapped had made manifest the need for instantly linking into health services if the educational agencies' assessments were to be treated realistically and were to be of benefit to children. Massachusetts' law (Chapter 766) requires a physical exam accompanying developmental assessments prior to preparing an individual education plan (IEP) for a student. Federal law (P.L. 94-142) involves a broader definition of appropriate education, including physical and emotional restorative services such as physical therapy, audiology, and supportive services such as psychological assistance and other rehabilitative work. In a number of cases mainstreamed special needs students require general medical services which must be received outside the school since they are not and cannot be provided by the school health program.

A MAJOR NATIONAL PROBLEM

This case study of Lawrence reflects a major national problem affecting the health, welfare and education of children from low-income families. Handicapped youngsters often have extensive health care needs as well as educational needs. Concomitantly, poor health care contributes to the

higher incidence of educational problems in economically deprived families. Consequently, a priority goal of Project Good Health in Lawrence was to improve pediatric health status within the community through the integration of health, education and social services. By a brokering approach, a collaborative was able to identify children who had similar health needs. The result was aggregating these needs and matching them with the required resources and services.

INTERAGENCY COLLABORATION

No single agency can provide the broad spectrum of health services required by some thousands of children. Interagency collaboration, managed through a collaborative, can strike a balance between needs and resources. Although such skills and services might be offered by separate provider agencies, they can be administered comprehensively to the population of the target schools. Thus, this demonstration project was designed to integrate with other groups that offer resources and special services. Hence, the Lawrence Children's Health Project operates in an outreach mode and it links with resource providers to deliver needed services. These external resources are integrated by the project management staff, which, in turn, describes comprehensive service requirements for health improvement in the school system.

So this effort by the Massachusetts Department of Public Welfare, in collaboration with the Merrimack Education Center and the Lawrence Public Schools, to integrate health and special education services, is a valuable case to study. It has presented and continues to offer many novel challenges and opportunities.

A PHILOSOPHY OF BROKERING--SHARED RESPONSIBILITY

One of the first sets of such challenges and opportunities was seized by the participants from the outset of this project. They adopted a brokering

strategy by which they joined their collective wisdom and resources to share the responsibility for the progress of the Project.

To improve access by students to health services, the cooperating agencies described the need and resource requirements which could impact on the demonstration sites. Although the State and Federal laws and regulations require the school to provide equitable access to resources, there is the need for grass-roots community support and commitment to translate these policies into action. Sharing through interagency planning their respective groups' commitments to policies impacting on the handicapped and minorities is the initial step in designing the brokering strategy. In order to meet the needs for services that flow from this commitment, the brokering strategy is then used to negotiate and firm up contracts with individual providers and operating organizations that are already delivering health, educational and social services. A two-way exchange of information and resources is essential between the school district and the resources external to it.

BROKERING IN ACTION

This demonstration project involves the contractual cooperation of the Lawrence Public Schools, the Massachusetts Department of Public Welfare (Medicaid Division), Children's Hospital Medical Center, Boston and the Merrimack Education Center, among other groups. As the broker the Merrimack Education Center arranged the contract with the State Department of Public Welfare so that the Lawrence Children's Health Project (LCHP) could be implemented. MEC also negotiated a service agreement with the Lawrence Public Schools. MEC then brokered the contract with the State Department of Public Welfare (DPW) to serve as alternate provider of EPSDT services under Project Good Health, such as screening and referring Medicaid-eligible children. A waiver was then arranged with DPW by MEC to allow the Project to pay for services to children who were not eligible for Medicaid, but were in

financial need. MEC also negotiated the contract with Children's Hospital Medical Center, Boston. In all of these arrangements, as are vizualized in Figure I, the Merrimack Education Center serves as the broker between students and families of Lawrence and those groups and individuals who are providing services to them.

In addition to arranging for providers to deliver the services already mentioned, MEC agreements were formulated with Bon Secours and Lawrence General Hospital to accept referrals. MEC also brokered agreements with primary care physicians in the area who arranged to accept payment through the Project. Dental practitioners contacted through MEC agreed to receive LCHP referrals. MEC brokered pharmaceutical services through an area pharmacy. MEC leased the medical van for screening activities. The Community Action Council (CAC) then agreed to coordinate testing for lead poisoning. The Sickle Cell Center of Boston Public Health and Hospitals agreed to provide counseling in Lawrence. Then the Lawrence Boys Club provided space for the Sickle Cell Center. The Project co-sponsored with the CAC a permanent facility in Lawrence for sickle cell counseling, giving greater stability to this part of the health services program. The Family Health Center then agreed to conduct Pre-K developmental assessments and the CAC Day Care Center contracted through MEC for the physical screening of clients. The effectiveness of the brokering strategy can be observed as this case is studied. Fiscal, legal and professional arrangements have been put into operation through the agency of Merrimack Education Center as the broker. The effect has been to bind together a multiplicity of agencies and individuals in the community who are committed to making this program benefit children on a long-term basis.

<u>HOW THE COLLABORATIVE WORKS</u>

Originally the collaborative model was developed by Merrimack Education

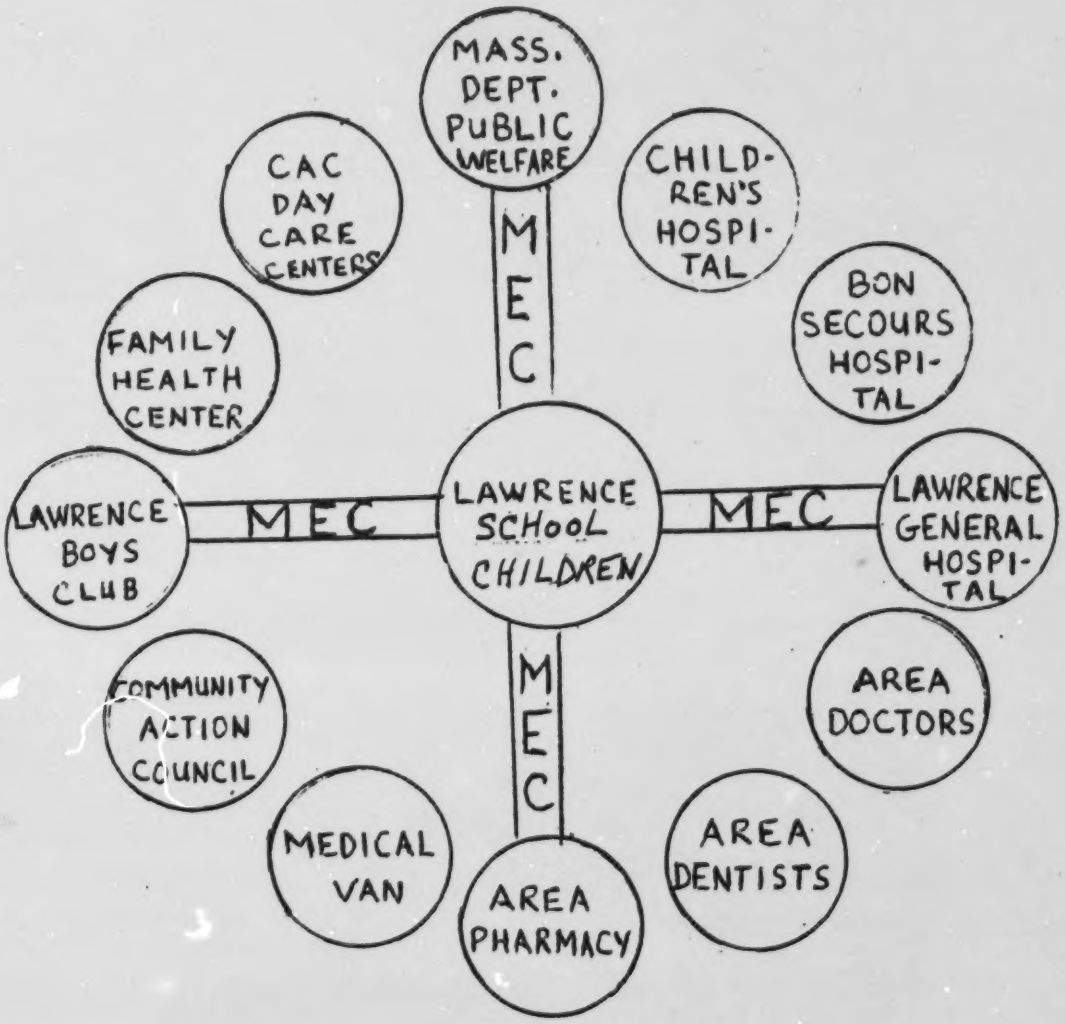


FIGURE I

BROKERING RELATIONSHIPS ESTABLISHED BY

MERRIMACK EDUCATION CENTER

IN LAWRENCE CHILDREN'S HEALTH PROJECT

Center to address problems in the delivery of special education services. For the Lawrence Children's Health Project the model has evolved to apply to the general field of health and human services delivery. In essence, the collaborative is a community of interests that matches and develops resources to meet the needs of its members. A school health collaborative includes agencies and providers in both the education and health fields. A core of special health services is offered by the collaborative to the school at a specified physical location. Administrative coordination is also offered for referral and follow-up for children in need of further services. The fiscal support of EPSDT/MEDICAID is a major incentive insuring full utilization of the health services.

ESTABLISHING A COLLABORATIVE

Mandates in EPSDT guidelines and in Special Education regulations require an expansion in both the number and types of services available to students. The eight essential steps in establishing a collaborative which uses a brokering strategy to deliver this broad range of services are the following:

1) Joint interests and common needs identified;

2) A collaborating organization is formed which includes agencies representing clients who share the identified needs (e.g., health, social services and education);

3) One agency, serving as broker, provides leadership and formulates basic policy to guide the project's operation.

4) Resources are compiled to meet the identified needs, and service providers with resources are matched to address client problems;

5) Project management directs the project and implements the collaborative policy, further clarifies needs and identifies additional service provider groups;

6) Linkages are formed among client groups and service provider groups, including information giving and referral functions. Since needs are based upon a community or regional population, they are aggregated.

7) Contracts are signed with provider agencies and procedures are set up for case management staff to design and create client pathways. Continuity of services to clients and follow-through are the major concerns of the family health workers who manage the cases.

8) The delivery of services is evaluated on an ongoing basis. Periodic screenings of clients, for example, occur within the framework of a system established to provide ongoing services. Interpretation of data related to client care and progress is readily accessible through a computerized referral and medical record system. Thus formative and summative evaluation are made possible for the client, as well as for the health care delivery system itself.

THE BROKERING STRATEGY

When the client system is a school population and the problem area is as complex as child health, several essential components in the brckering strategy must be put into place. (See Figure 2)

In the Lawrence Children's Health Project, the Merrimack Education Center adapted the brokering model to meet the needs of the community. The major elements of this brokering strategy described on the following pages are:

1. Project Management and Operation
2. Management Information System of Client Needs and Available Resources
3. Matching and Linking Resources to Client Needs

1. Project Management Operation

Project staff are responsible for the management functions such as planning, coordination, policy formation and resource allocation. Knowing the clients enables the staff to balance the needs side of the equation with the resource requirements for health services. The three strategies used by project management are:

1) aggregated needs, needs specification and prioritization;

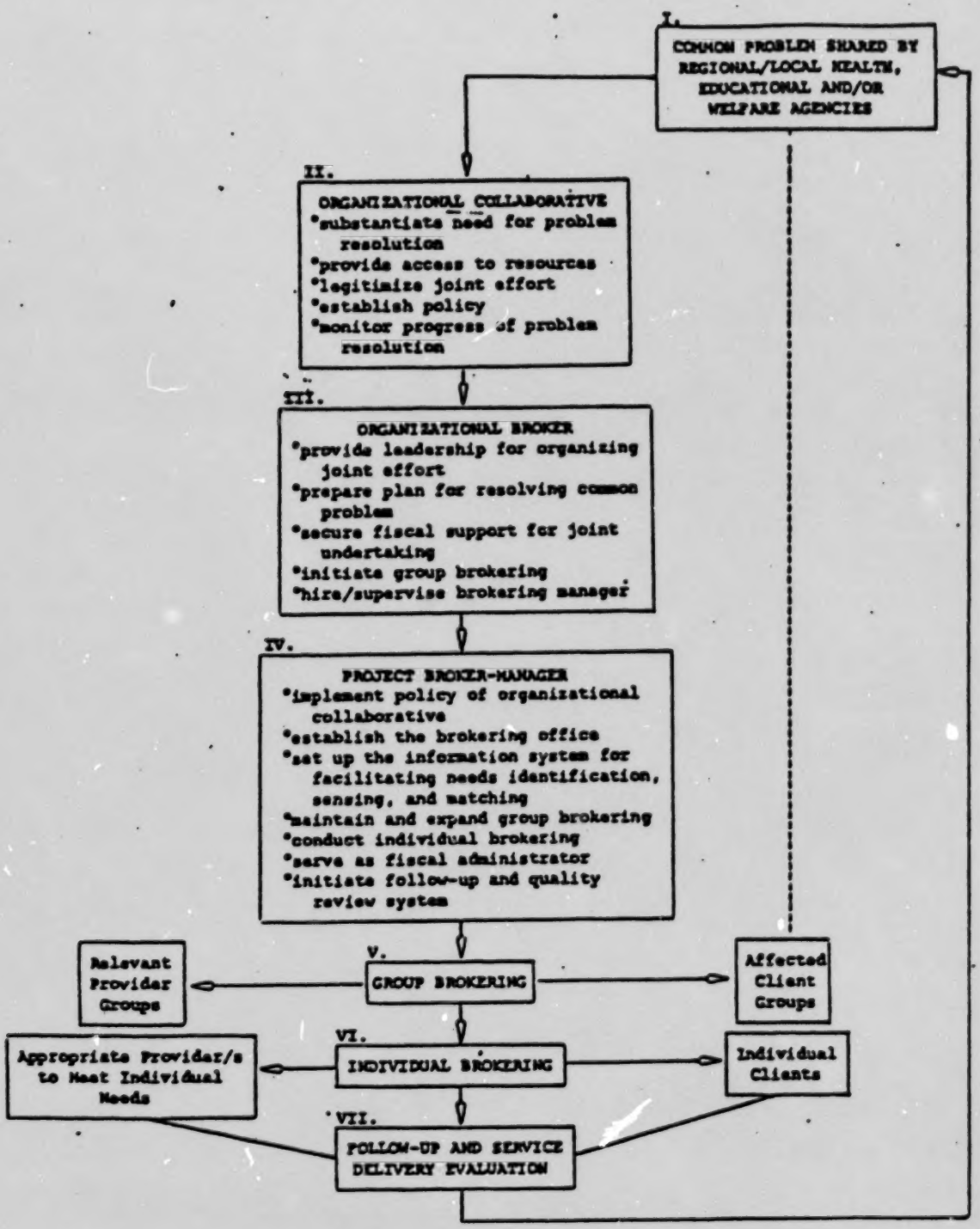
2) anticipation of projected unmet needs;

3) mobilizing clients through outreach and advocacy roles.

Project staff, working with the school administration and the advisory board, scan the entire client group to find aggregate needs and to analyze

Figure 2

SCHEMA DEPICTING COLLABORATIVE APPROACH TO PROBLEM RESOLUTION EMPLOYING THE CONCEPT OF ORGANIZATIONAL BROKERING



problems. By cumulating needs, project staff can develop, locate or encourage other groups or individuals to provide services matched with the identified problems. Hopefully, volume can also lower unit costs in the purchase of services while providing more convenient access for clients.

Similarly, project management organizes the supply side of the equation by (a) putting in place an advocacy process that can create an effective linking system; and (b) facilitating an effective and efficient supply of services meeting the needs identified.

By analyzing resource availability, the project insures that existing services are used before new programs or systems are developed. Often, available services are hidden by poor "marketing"; the project then serves as broker to uncover underutilized resources and to encourage providers to adapt and market in tune with the identified needs. In an outreach and advocacy role, the project staff assist families in accessing the needed services.

2. Management Information System

An efficient computer system for collecting, storing, organizing and retrieving information on clients and resources is required to perform the matching or linking. A management information system is needed to track clients as they go through the referral process so that continuity can be maintained; follow-up can be systematic and rescreening can be scheduled at appropriate times. This system also enables trends to be identified, longitudinal studies to be conducted and quality assurance to be monitored.

3. Matching Resources to Needs

Project managers use a variety of strategies such as repackaging available resources, retraining service providers, developing or selecting new resources, aggregating and redefining client needs. They match resources with client needs with the paramount goal being "the best fit" that addresses a number of client needs effectively and economically.

FUNCTIONS OF THE BROKERING ORGANIZATION

The brokering organization follows six basic steps in resolving client needs. These steps outlined below are further illustrated by Figure 3.

1. *Needs Identification--As an initial and a continuous step in the process, needs are identified reliably and accurately.*

2. *Needs Sensing--Information about client needs and characteristics is recorded systematically to enable continuing analysis of identified needs.*

3. *Needs Valuing--Persons and/or agencies with existing responsibilities for or potential interests in the well-being of the client must come to place a value on the resolution of the identified needs, and must act to legitimize the role of others who act as service brokers or providers.*

4. *Needs Matching--Identified needs of clients are matched with appropriate providers of services.*

5. *Service Delivery--Qualified providers deliver the services necessary to meet the specified needs.*

6. *Evaluation--The effects of delivered services are assessed to determine the effectiveness and efficiency of such care. If unmet needs are found, they are recycled for resolution. Data gathered are analyzed for the redirection and refocusing of the goals and operations of the Project.*

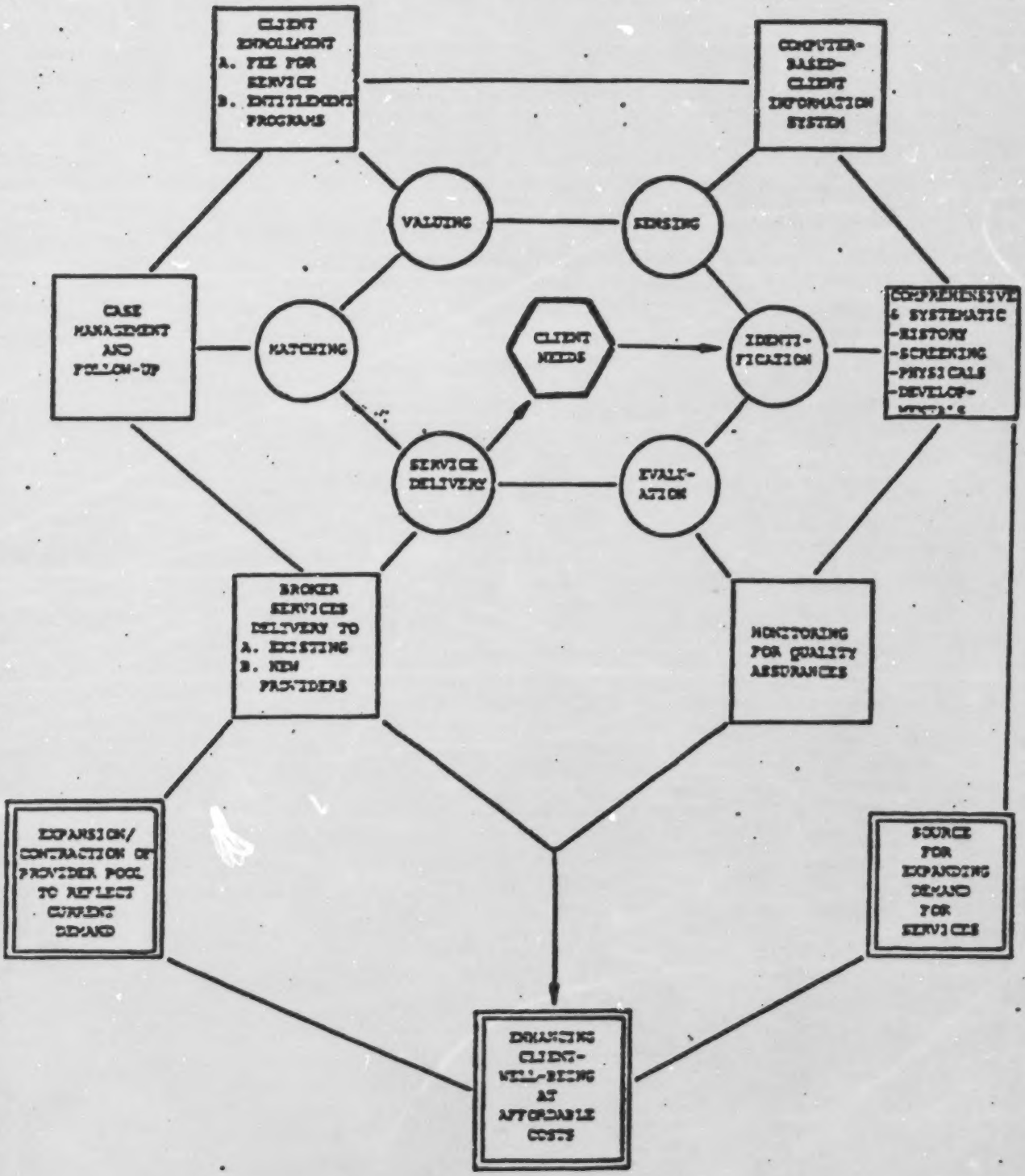
JUAN AND MELISSA

Juan and Melissa are two of the 2,278 students who are benefitting from the Lawrence Children's Health Project. Juan had had a sporadic record of attendance during his first two years in school. Reports from prior teachers indicated ear problems and throat infections as the main causes. As he missed fundamentals, he seemed to slip behind his peers gradually. Since English is Juan's second language, attempts to "catch up" when he returned to school too often met with failure.

Today Juan's case reads like a real success story, thanks to this Project. Health assessments determined the need for an eye, ear and nose specialist to whom he was referred at once. Essential dental care was also indicated and provided. The developmental assessment designed at Children's

Figure 3

SCHEMA OF THE LAWRENCE CHILDREN'S HEALTH PROJECT:
Featuring the Application of the Brokering Concept
for Meeting Human Service Needs



Hospital targeted notable deficiencies in the auditory-language functioning area. An audiologist has followed up with Juan on the medical specialist's prescriptions for remedying his hearing. A speech therapist is working with Juan to help him master some of the sound combinations he has found difficult to grasp since English is his second tongue. Remarkably, Juan is today reading at his grade level, is quite regular in his attendance and is, according to his teachers, quite well adjusted at school.

THE CASE OF MELISSA

Melissa has yet to enter school. This past year, as a 4-year old, she was detected in the examination by a pediatric fellow from Children's Hospital, Boston, as having sickle cell anemia. Melissa's mother had heard about the Good Health Program from having her child at the CAC Day Care Center where Melissa's physical assessment occurred. A family care (outreach) worker visited Melissa's family and told them of the counseling provided in Lawrence by the Sickle Cell Center of Boston Public Health and Hospitals. Her father went with her to the Lawrence Boys Club's Sickle Cell Center. They still attend these counseling sessions now that a permanent home for sickle cell counseling has been found in Lawrence through the Community Action Council (CAC) working with this Project. The family care worker also recommended a developmental assessment for Melissa after noting some problems with her fine motor functioning.

Melissa's mother then took her to Lawrence's Family Health Center which administered the Pre-Kindergarten developmental assessment designed and developed by a team of specialists at Children's Hospital. Certain neuro-developmental deficiencies were discovered and these have been traced back to lead poisoning, as determined through testing provided at the Community Action Center. Lawrence General Hospital assists in the follow-up

care of Melissa and her problems. Fortunately these have been identified early and prescribed treatment is being administered systematically. What otherwise might have become a disaster-filled life is now being put back together again. Such cases as those of Juan and Melissa are illustrative of what Early and Periodic Screening Diagnosis and Treatment (EPSDT) is doing today in the City of Lawrence.

HOW EPSDT WORKS IN THE CITY OF LAWRENCE

Thus, the Lawrence Children's Health Project is a preventive health program designed to screen children in the areas of health and developmental maturity. The Project works closely with the Lawrence Public Schools to help families attain the best possible health for their children. The Lawrence Children's Health Project takes place in the schools, or in a medical van located on the school grounds. The mobile van has all the facilities of a doctor's office, including a laboratory, an examining room and a testing area. A pediatric nurse practitioner gives the health screenings to the children whose parents join the voluntary Project.

In addition to testing for hearing and vision, the health screening includes a complete physical, a nutritional assessment and lab tests including those for lead poisoning, tuberculosis and sickle cell anemia. Children are also referred for a dental screening. A developmental assessment, designed at Children's Hospital, examines developmental maturation, measuring such skills as auditory memory, sequencing of information, and language skills as well as visual perception and motor skills. Altogether, the exam lasts about two hours.

The Project staff reviews student records, the medical history obtained from parents and teachers and then assists families in finding the proper services. Project staff make the necessary and appropriate referrals after screening, using the medical and other human services of the City.

Young persons in the City of Lawrence who are under 21 years of age are eligible to participate. This health program is sponsored by the Health Care Financing Administration (HCFA), and is administered by the Merrimack Education Center, Chelmsford, Massachusetts.

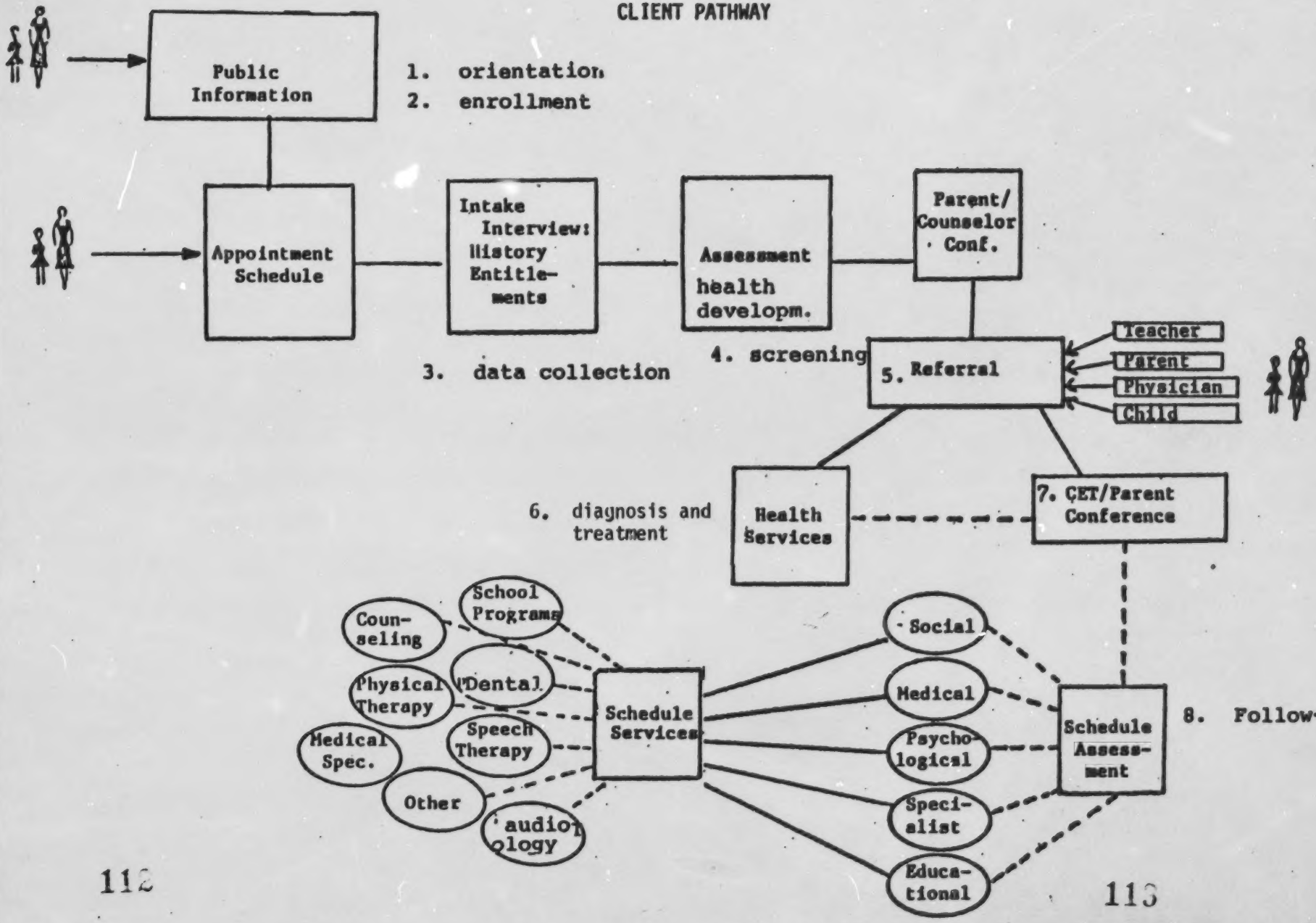
CLIENT PATHWAYS FOR CASE MANAGEMENT

The development of brokering mechanisms, coordinated case management, and service and financial information systems represent the major innovations of the LCHP--a new configuration of service relationships. Services integration in Massachusetts has ranged from the expansion of single categorical programs through contracts for services or referral agreements, and physical co-location of health and educational services components in a single comprehensive delivery approach. Beginning with the EPSDT categorical funding base, the LCHP programmatic response was expanded to integrate complementary services within the school-based demonstration site, including health, developmental assessment, educational, social and dental services. Major providers from the Greater Lawrence area offer a range of health services and are licensed and certified by the State to accept Medicaid reimbursements. Working with these agencies, the LCHP has contracted for these established services from the health delivery network. A service contract was developed that enabled cooperation between the Project and Children's Hospital Medical Center in Boston. The outreach and client pathway approach evident in this case study is represented in Figure 4.

The Program's major goal was to complete a three-year cycle in the Lawrence Public Schools selected as a demonstration site, testing the efficiency and effectiveness of the Lawrence Children's Health Project design. An additional summer school program served the pre-school siblings of children in these same elementary schools. Through outreach and awareness

Figure 4

CLIENT PATHWAY



activities, in cooperation with the school administration, LCHP explicitly defined the nature of its services and functions and the ways in which services could be offered to families.

LCHP BECOMES MEDICAID VENDOR

In 1980, the LCHP applied to become a certified Medicaid vendor. In order to bill the State Medicaid office for screening services, Project staff determined Medicaid eligibility at the time of each health history. The screening included an expanded role for health services, using nurse practitioners and pediatric fellows from Children's Hospital, and employing provisions for full EPSDT service related to outreach and case management. The following components of the initial screen, as has been touched on in the cases of Juan and Melissa cited previously, illustrate the emphases of this Project:

1. Health Component--offers children in need of medical or dental assistance appropriate service referrals through the services of health specialists.

2. Developmental Assessment--neuro-developmental exams, designed at Children's Hospital Medical Center used for educational examination. Specific areas include: tempersequential organization, visual-spatial, auditory-language functioning, fine and gross motor functioning, and short-term memory.*

3. Social Services and Outreach--family care workers make home visits, contact parents and coordinate referrals to assist service agencies.

4. Identification and Enrollment--specially trained staff are assigned at the school to seek out and contact families:
   (a) to recruit unenrolled students and pre-schoolers; and,
   (b) to obtain parental permission to conduct the screening.

5. Staff Development--provides programs of in-service for Project staff and training for staff and teachers.

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*Within each school, Project staff conduct screening and assessments to identify those children evidencing high risk behaviors. Staff then determine which children receive recommendations for referral by making clinical decisions based upon:
- ratings by teachers;
- interviews with parents;
- review of health history; and
- appropriate assessments.

SIGNIFICANT FINDINGS

1. Across the Commonwealth of Massachusetts and throughout the United States, a patchwork quilt of service agencies and providers makes it necessary for personnel to be highly skilled to piece together a program in response to special health and educational needs. The immediate goal of EPSDT, in response to these needs, is to detect potentially debilitating health problems, and by so doing, ultimately to improve the health status and decrease the overall dependency of the children from low-income families. Prior to the initiation of the Lawrence Project, however, only a small percentage of eligible children in Massachusetts were receiving essential health services. This Project, through a brokering organization sponsored by MEC, has provided the mechanism for clustering a critical mass of community resources to respond with immediacy to the needs of these deprived youngsters. Such a successful strategy should be carefully considered for replication across this Commonwealth and throughout this nation.

2. The brokering strategy demonstrated increased access to EPSDT services for students in Lawrence elementary schools. Brokering is a strategy for increased coordination and for rationally integrating the pieces of the patchwork quilt. It has been demonstrated that coordination of services has a positive impact on accessibility, continuity and efficiency of service delivery to students.

> The LCHP has made impressive progress towards demonstrating that its EPSDT service delivery approach is a genuine alternative that works both in terms of numbers reached and the quality of services delivered.*

3. Sixty-five percent (65%) of the students screened receive AFDC or Medicaid while almost all (89%) receive free or subsidized lunch in the school. Twenty-six percent (26%) of children have Blue Cross or other health insurance, and fourteen percent (14%) report neither AFDC/Medicaid nor private health

insurance. Presumably this latter group comprises the working poor and constitutes a group at particular risk due to decreased access or unavailability of health care services. A special waiver was arranged to serve non-Medicaid students; when services are provided for Medicaid-eligible students, the Project can bill the Medicaid office for performing services to eligible children.

Thus, it can be seen that the LCHP is providing outreach to low-income families and is able to identify and serve the eligible students as well as the working poor. The group in the "middle" income families, who are not eligible for Medicaid and are not able to afford adequate medical care, is now the group with poorest access to health care services. With inflationary spirals, this group is increasing rapidly.

4. The Massachusetts Association of School Superintendents has noted that, if similar billing for medical services could be submitted to Blue Cross/Blue Shield, whereby these health costs could be transferred out of special education budgets, approximately twenty-six million dollars would be avoided by Massachusetts schools annually.

5. An added advantage to the LCHP program was the increased comprehensiveness of services. Comprehensiveness can be operationally defined as the type and number of physical assessments performed by the nurse practitioner and pediatric fellow, services performed by the family case worker, including neuro-developmental assessments, and services provided by community specialists. The LCHP serves as a model of coordinating EPSDT services with the mandates of P.L. 94-142 and Chapter 766. The demonstration project included an expanded role for health services, using nurse practitioners and pediatric fellows from Children's Hospital for initial screening and rescreens, and provision for full EPSDT service related to outreach and case management. Much flexibility was achieved through referral of students

for follow-up diagnosis, treatment including dental examination, through individual providers and clinics in the Greater Lawrence area.

6. The special education objectives of the Lawrence Public Schools were augmented because the Project was able to prepare the required physical assessment data in timely fashion for those elementary schools being served. Within each of the four school sites, LCHP staff conducted screening and assessments to identify those children evidencing high risk behaviors. Medical and family case workers determined which children would receive the referral by making clinical decisions based upon: ratings from teachers; from family history and risk categories determined through parent interviews; from a review of each youngster's health history; and from appropriate assessments. Physical assessments are routinely available from the LCHP for every special needs child from the target schools. The project made available over 300 physical exams for special needs children. This use of data generated by the LCHP is one of the most visible successes the Program attained. Specially trained staff are then assigned at the school to provide continuity, to seek out and contact families for identification and outreach and to coordinate referrals to appropriate service agencies.

7. The follow-up, parent education, client advocate and provider linkages further expanded the comprehensiveness of the services available through LCHP. The Project was successful in obtaining a variety of entitlements for students. Eighty-three percent (83%) of all problems identified were followed up by family case workers. Approximately 1,500 cases were referred to parents for action. In 97% of those cases, the parent took the necessary action for referral.

SUMMARY

In terms of increased access to services, increased comprehensiveness of services, greater integration and coordination of service delivery, the LCHP has accomplished much in the short time that has elapsed. Special education mandates have been met in terms of the required physicals. Furthermore, the physical screening procedures comply with the American Academy of Pediatrics' standards for comprehensive examinations. In addition, at-risk students, identified by their teachers on a rating scale, were also provided a comprehensive, neuro-developmental assessment developed by Children's Hospital Medical Center, Boston.

In summary, a total of 2,278 students received comprehensive health assessment which represented an average of 92% of the total school population served in the four elementary schools. Whereas only a small proportion of eligible persons typically enroll and receive EPSDT services, the Lawrence Children's Health Project was able to recruit and serve over 90% of the target population of four elementary schools.

FUTURE DIRECTIONS

Integration of services within the Lawrence community and organizational changes are now occurring in the school health services delivery format. During school year 1981-82 the Project has assumed supervision and administration of the school nurses while the school department continues to pay the expenses of these school health personnel. In effect, the school administration has agreed to total integration of the previously independent school health services and, similar to the Buffalo, New York and Gary, Indiana school systems, has moved to maximize the school nursing service through greater integration with all group and individual resources coordinated in the community by this

Project. This coordination of services, both from the standpoint of how EPSDT services are delivered, and the manner in which school health services are delivered in the schools, demonstrates two very important contributions of the organizational brokering approach that is leading to maintenance of this Project, now that the initial three-year funding cycle has been completed.

POLICY IMPLICATIONS

Among the considerations for legislators and other policy-makers which this Lawrence Case Study highlights are:

1) Interagency collaboration and coordination--how to bring to bear most effectively and efficiently the critical mass of health, education and social services essential to address the needs of young people, particularly youngsters from low-income families and the working poor in a given community. This is a critical need of State-wide and national impact which must be addressed urgently by State and Federal legislators.

2) Brokering strategies--how to faciliate collaborative mechanisms such as those employed by the Merrimack Education Center in synergizing the combined energies of many separate service providers to meet more clearly defined needs that emerge, as has been described throughout this Case Study.

3) Recognition that free-market exchange principales do not totally satisfy the needs of the low-income, Medicaid-eligible population; thus, structured social measures have to be put in place by government and the voluntary collaboration it fosters to enhance the natural diffusion systems and provider availability.

4) In a Proposition 2½ era and with increasing Federal outs, more creative ways of extending and maximizing the vital services of the school district's health staff must be of primary concern to local, State and

Federal officials. A practical, how-to approach to solving this problem has been detailed throughout this Case Study. A primary outcome of such a Project becomes the streamlined, comprehensive delivery system operating smoothly after the seed money has been utilized.

5) With Federal and State laws and guidelines mandating that special needs of young persons aged 3 to 21 be met equitably so that they may achieve the maximum of their potential, the cost-effective approach of blending comprehensive health, education and social services, documented in a computerized management information system, as demonstrated in the Lawrence Children's Health Project, is a model worthy of replication throughout Massachusetts and across this nation.

6) Preventive medicine must impact at the earliest possible time so that screening can result in diagnosis and treatment, renewed periodically, as implemented in Lawrence through Early and Periodic Screening, Diagnosis and Treatment (EPSDT). The cost savings are incalculable in terms of the renewed vigor and realization of human potential given to youngsters participating in the case studied. A school-based model works effectively.

APPENDIX F

MICROCOMPUTER INFORMATION SYSTEM

LAWRENCE CHILDREN' HEALTH PROJECT
MICROCOMPUTER INFORMATION SYSTEM
A DEMONSTRATED SCHOOL HEALTH RECORD SYSTEM

Prepared for:

Massachusetts Department of
Public Health
Office of School Health

Prepared By:

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August, 1982

TABLE OF CONTENTS

		PAGE
I.	INTRODUCTION	1
II.	DESCRIPTION OF THE SYSTEM	2
	A. SOFTWARE	2
	B. HARDWARE	6
	C. OPERATIONS	8
III.	ANALYSIS OF APPLICABILITY	11
	A. USE IN LAWRENCE PUBLIC SCHOOLS	11
	B. POTENTIAL USE BY OTHER SCHOOL DISTRICTS	12
IV.	APPENDICES	
	A. DATA BASE STRUCTURE	
	B. EXAMPLES OF OUTPUT REPORTS	
	C. HARDWARE/SOFTWARE SPECIFICATIONS & COSTS	
	D. MAJOR FORMS	

I. INTRODUCTION

Consider the need to keep track of 8,000 students; the need to know what school they are in; whether they have had the required physical exam; whether they have been properly immunized; and whether they have received the necessary vision, hearing and posture screening.

This was the need that had to be met by the Lawrence Children's Health Project (LCHP) during the 1981-1982 school year. For two years the Project had been providing physical exams to Lawrence school children. In order to allow more coordination between the LCHP and the school health program as well as to provide supervision for school nurses, the superintendent gave responsibility for the school health program to the Project in the Fall of 1981.

The Project had previously experimented with a mini-computer health record system for its own data and management needs. It had been determined that this system would be too costly to purchase ($80,000 for hardware) and yearly costs would also be high ($20,000). Thus, an alternative system was sought.

The Project's parent organization, the Merrimack Education Center, Inc., had experience with microcomputers. The Project decided to use this experience to develop a micro-computer based system. Design of the system would include management needs of the Project as well as the health record needs of the school health program.

The Project secured support from the Massachusetts Department of Public Health for the initial data entry for this system. This paper reports on the success of that demonstration and indicates that the microcomputer system using a data-based management language known as dBASE II is an extremely important tool in managing a school health program.

II. DESCRIPTION OF THE SYSTEM

A. SOFTWARE

The operation of the LCHP data management system requires: a data-base management language and programs written on that language (software); a computer and related peripheral (hardware); and a knowledgeable individual to operate and maintain the system in a mannner useful to the Project and the Lawrence Public Schools (operations).

The software chosen for the LCHP system was chosen after considerable analysis of the data needs of the Project. This analysis was primarily part of a previous review conducted by the Project when a minicomputer system was being tested. In addition, the requirements for the school health records were reviewed and included in the system design. The analysis for the micro-computer system included a listing of data items to be stored and the major reports to be generated from the stored data. The final list of data items stored on the system is contained in Appendix A.

Following the data analysis, the Project hired a consultant knowledgeable in data-base management, Retrieval Technology, Inc. of Chelmsford, Mass, who reviewed the Project's needs and designed any programs needed by the Project. This review resulted in a decision to use the language dBASE II produced by the Ashton Tate Corporation of California. dBase II is one of the most powerful data base management systems available.

To operate dBASE II on a microcomputer, the language CP/M is required. This is necessary because dBASE II is a "user friendly" language which requires a processor language in order to communicate with the computer. This allows dBASE II to be as much like English as possible so that the user does not need to know any extensive programming.

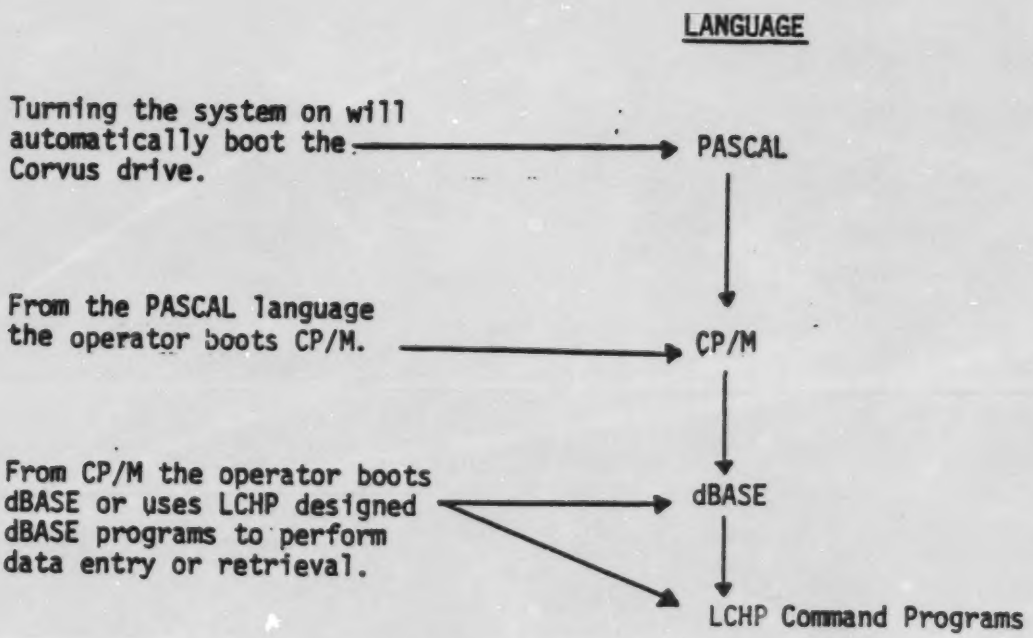
The manual that comes with the language provides the necessary instructions for operating dBASE. No special programs would be necessary, however, the Project decided to have Retrieval Technology write several input and output programs to make data entry and data retrieval even easier than with dBASE alone.

Eventually the Project needed to obtain a Corvus System hard disc to provide adequate storage capacity. This is discussed further under "B. HARDWARE". To operate the LCHP system using the Corvus disc, it was also necessary to obtain the language PASCAL which is used to boot the CP/M language to get the system started.

Thus there is a multilevel software structure which can be depicted by the following diagram:

Figure 1

LCHP SOFTWARE CONFIGURATION


LANGUAGE
Turning the system on will automatically boot the Corvus drive.
PASCAL
From the PASCAL language the operator boots CP/M.
CP/M
From CP/M the operator boots dBASE or uses LCHP designed dBASE programs to perform data entry or retrieval.
dBASE
LCHP Command Programs

Individuals using the system do not need to know PASCAL and CP/M. Standardized instructions allow the user to move to dBASE without fully understanding what has occured. This is sufficient for most users. One or two, however, need to know enough, either through prior knowledge or through reading the manuals, to use utilities available through CP/M and PASCAL in order to maintain the systems.

The LCHP grouped its data into eight different categories. The first three are applicable to the school health program.

1. Demographic data - such as name and address.
2. Screening data - such as date of vision, or hearing, or posture screens.
3. Immunization data - such as date of Polio booster.
4. Enrollment data - whether a student is enrolled in the LCHP for physical exams.
5. History data - such as the date the history was taken for enrolled children.
6. Direct Health Assessment data - such as the name of the individual conducting the physical exam.
7. Test results - such as a positive finding on a urinalysis
8. Developmental data - reporting the results of the LCHP developmental test.

The structure (or content) of each of these groups is given in Appendix A. Each group is referred to as a Data Base File (DBF). This structure was easily created using standard dBASE II commands. The structure can be changed at any time to meet changing data needs. This includes adding or deleting data base files. The maximum number of fields (data items) for each data base file is thirty-two (32).

The LCHP created programs - called Input Command Programs - to allow for ease of <u>data entry</u>. These programs allow the user to respond to a full video screen (also referred to as a CRT for Cathode Ray Tube) of questions. This is similar to a blank form which must be completed.

The response to each question is entered on the keyboard of the computer and simultaneously displayed on the screen. Corections can be made while data is being entered.

It should be noted that input and output were written using a word processor. The Project has the word processing language called WORDSTAR. This is one of the most popular word processing languages for microcomputers. The Project can use this to modify existing programs or to write completely new command programs.

Data can also be entered using a standard dBASE command called APPEND which also prompts for a full screen of data but utilizes the abbreviated version of prompt questions. As a student's records are entered, he/she is assigned a unique identification number which is used to distinguish that student's records from all others.

Once data is entered it is very easy to make changes using the standard dBASE command called EDIT. This command allows addresses to be changed or immunization data to be updated. Any data item (field) can be edited. This was very useful in Lawrence because the student population is very mobile and a central system for changing addresses and schools is important. Another important use of the EDIT command is to update immunization or screening data.

If a student leaves the school system, it is possible to delete that record. The normal procedure is to transfer the data to a separate storage disc where all data on withdrawals are kept. Then using the DELETE command, in conjunction with the PACK command, that student's record is removed from the active data file.

Output reports can be obtained in several different ways using standard dBASE features or using programs written by LCHP. The major dBASE features are:

1. DISPLAY - usually used to display data on an individual student. For example, to review the immunization record to check compliance with state requirements.

2. LIST - usually used to list several students who meet certain conditions; e.g., a list of all students with a failed vision screen. Only fields (data items) selected will be listed.

3. REPORT FORM - provides a more structured output of data on students. This command allows the user to predefine, or define on an adhoc basis, the format for reports. This includes column headings and the number of lines per page as well as the content of the report.

4. FIND - a powerful search feature which allows the user to find students' records within a matter of seconds, typically two to three seconds.

Examples of these data searches are given in Appendix B. These can only search and display data from one data base file.

In order to allow the Project to display data from more than one data base file as well as to provide simple commands for creating useful reports for regular Project users, several Output Command Programs were written. Examples of the reports created by these programs are included under separate cover.

B. HARDWARE

Given that the software chosen for the LCHP was dBASE II and CP/M, it was necessary to obtain hardware capable of supporting the LCHP application. The Project's consultant recommended the Apple II Plus as a reliable system capable of meeting the needs, as defined.

In addition to the standard Apple II Plus which comes with 48K of memory (48,000 characters of internal storage), it was necessary to have an additional 16K of memory to support dBASE II. This was obtained through the purchase of a Microsoft Card as well as a Z-80 card to support CP/M.

Further, the Project needed a video screen (Zenith was chosen as a reliable model with green background which is easier on the eyes than a black background) with 24 lines and 80 columns. This required the purchase of a VIDEX board for proper modification of the Apple to display 80 columns.

The initial test of the system was conducted using two floppy disk drives obtained with the Apple. These drives use standard 5 1/4 inch square disks which allow for storage of 126,000 (126K) bytes of information on each disk. As the system developed, it became readily apparent that the floppy disks were much too small for storage of data on 8,000 students. The Corvus System with CP/M was new on the market but was the only larger storage system available. It was purchased, providing 5.7 megabytes of storage on a single hard drive. The Corvus has a built-in mirror system which is used to backup the data on the drive as part of regular maintenance. It would take over 45 floppy disks to equal the storage capacity of the Corvus. It was estimated that as much as 10 megabytes of storage could be necessary if the entire student population in Lawrence were to be entered--if all data base files were fully utilized. The 5.7 megabyte sytem was estimated to be enough for the school health records alone (500 characters stored on 8,000 students equals 4 megabytes). The Corvus comes as either 5.7 megabytes, 10 megabytes, or 20 megabytes. As many as four separate drives can be connected to the Apple at one time. Thus, expanded storage space is readily available.

There were two other peripherals needed. The first was a printer. The Project had a printer from its previous test of a mini-computer and this printer was easily connected to the Apple via a serial card purchased and installed inside the Apple II Plus. The other peripheral needed was a video tape machine--used to connect with the Corvus drive. The Merrimack Education Center owned a video tape player/recorder as part of a separate project and so no purchase was necessary.

In summary, the Project purchased or already owned the following equipment to support its application of dBASE II in the Lawrence Public Schools. The total cost to the Project was $7,550.

- Apple II Plus Computer
- Zenith Video Screen
- Corvus 5.7 Megabyte Disc Drive
- Two Apple Floppy Disc Drives
- Printer
- Video Tape Player/Recorder
- Internal Circuit Boards for communications and modifications of Apple

Appendix C presents a more detailed cost description and basic specifications for each item.

This hardware was required to support the LCHP application. Other school districts may be able to use existing equipment. Hardware vendors should be consulted to determine these possibilities. Keep in mind, however, that storage of up to 500 characters per student (as required by LCHP) does need a substantial amount of storage space--readily accessible. A school district of 5,000 students would require storage of 2,500,000 characters or 2.5 megabytes. This is roughly half of a 5.7 megabyte Corvus. A minumum of 20 floppy disks would be required if a larger hard drive such as the Corvus were not available. Although floppy disks are feasible (and were considered at one time by LCHP), they are not recommended for this size database.

C. OPERATIONS

Operation of the Health Record System was an important factor in choosing the hardware/software configuration. The system is operated by a Data Clerk. No prior knowledge of computers or computer programming is

needed. The manuals written by the software manufacturers are usually very detailed and require some familiarity with microcomputers, however, the Project is preparing its own manual designed to explain the normal, day-to-day operations of the system. This manual will aid all Project staff in easily accessing records as well as serve as a working guide for the data clerk.

Perhaps more important than the operation of the computer is the day-to-day paper flow which is necessary to update the records. This must be well thought out in order to assume timely and accurate information. The Project has the following sysytem:

1. When any student enters the school system, a registration form is completed. (See Appendix D for copies of major forms). A copy of this form is sent to the Project offices at Lawrence High School and the appropriate information is entered onto the Apple by the Data Clerk.

2. School nurses obtain the health records of the new students and notify the Project using the Health Record Data Sheet. The appropraite data items--immunization dates; immunization status; health exam completed; and vision, hearing and posture screening status--are entered by the Clerk.

3. Any time a student leaves a school, the principal forwards a "Transfer Out" form to the Project offices. This form indicates to what school the student is transferring and the student's new address. The Project Clerk compares this information with the data on the "Transfer In" form which is forwarded by the principal of the student's new school. Discrepancies can be checked and corrected prior to data entry.

4. Students transferring out of the school system are so noted on the "Transfer Out" form. The records of these students are off loaded to a floppy disk for storage. The data is readily available should the student reenter the school system.

5. Ad hoc inquiries regarding the status of any student are brought to the Data Clerk who finds the student record using the FIND and DISPLAY commands which are part of dBASE. Other project staff are to be trained to perform this search.

6. Ad hoc inquiries regarding the data for a group of students are handled in a similar manner. The DISPLAY, LIST and REPORT FORM commands are used. All staff will be able to use these commands.

7. Standard inquiries and lists of students (see examples in Appendix B) will be completed on a regular basis--usually by the Data Clerk or Project Coordinator. These reports are lengthy and therefore require some time to complete so will be scheduled when the computer is not otherwise being used.

In the initial stages of system design and implementation, the Project was able to devote the time of its Coordinator of Planning and Support to assure that the system was established. This is an important consideration in developing any system: will there be a person or persons available to troubleshoot, to deal with vendors, and to train the regular users of the system? Users do not have to be system-oriented for day-to-day operations. However, the availability of someone on-call must be included in the planning.

A final note on system operations is the consideration of the impact a new technology may have on existing personnel and procedures. The LCHP was a separate entity and could develop a microcomputer record system without a great deal of controversy. School nurses were asked for some input during the design phase and have begun to accept the usefulness of the computer, particularly regarding tracking student location and immunization data. Again, careful planning can avoid complications.

III. ANALYSIS OF APPLICABILITY

A. Use in the Lawrence Public Schools

Prior to the implementation of the LCHP Health Record System, all health records in Lawrence were kept manually by school nurses in an often inconsistent manner. Updating records, tracking children with incomplete immunizations, and transferring student records from one school to another were all activities which took a great deal of the nurses' time.

In addition, there was no centralized school database for tracking students. It was very difficult to know when a student left one school and entered another. Lawrence High School students are coded and entered on a mini-computer. During the 1982-83 school year, all students will be entered on this computer and attendance and grades will be centralized. With minor adjustments, the LCHP Health Record System will have data (i.e., IDNO) compatible with this mini-computer system. The health records will remain separate because of storage space on the mini-computer; ease of manipulation by the micro computer; and because the uses of the two sets of data are very different and, therefore, combining the data is not really required.

The following outlines the main uses of the LCHP System in the Lawrence Public Schools:

1. Centralized health records are easily updated and accessed by Project and school staff. This is particulary important because of the high mobility of Lawrence students.

2. Previous inability to keep track of school-wide immunizations status is eliminated. Students without proper immunizations are identified and proper action can be taken.

3. Similarly, vision, hearing and posture screening data is readily available--assuring that all students are receiving the proper screening. Also, those students who are at greater risk and have positive results are followed more closely for diagnostic and treatment services.

4. Demographic data on students is used for class lists and summary data--useful to Project staff, central office staff, and individual schools.

5. The flexibility of the dBASE II system allows for changes when necessary. Thus, there is an ability to keep the system compatible with the existing high school computer system and updated with all data needed.

6. This computerized system assists in scheduling school nurses--caseloads at each school are easily identified for necessary followup by nurses.

7. The completion of required reports for state agencies is enhanced by the computing and database management capabilities.

8. The time of school nurses is devoted more to nursing duties than toward paperwork so that students and families needing assistance and guidance are more likely to obtain it.

B. Potential Use by Other School Districts

The Lawrence Public Schools have eight thousand (8,000) students. The school health record system has been computerized using the database management language called dBASE II, an Apple II Plus Computer, and a Corvus Systems mass storage disk. This computer system could be applied in other school districts for the following reasons:

1. A school district with more than two or three thousand students has need of some mechanized system for tracking students--particularly if the students move frequently.

2. Reporting requirements are similar across the state--both for internal reports on screening status and for external reports to state agencies.

3. Numerous school districts are investing a portion of their school budget in microcomputers. These computers can have multiple uses, including health records.

4. The flexibility of dBASE and similar database management systems allows for custom designing the system to meet the individual needs of each district.

5. Paperwork and school nurse time on paperwork are reduced. Nurses can spend more time performing nursing functions.

It is apparent that most school districts could benefit from this type of system. However, careful thought should be given to the real needs of a district before purchasing equipment. If an existing manual system is adequate, there is no need to change. This would probably be true for smaller districts with limited enrollments. On the other hand, some districts own mini-computers and have access to programmers who can design or perhaps obtain database management programs to operate on the existing equipment.

These factors will influence the decision as to whether a microcomputer health record system is right for a particular school district:

1. What is the existing mechanism for tracking students and for analyzing their health status?
2. Is the existing mechanism adequate to insure healthy students, well scheduled and coordinated school health staff, and satisfactory reports for internal and external use?
3. What are the reports needed for the district's school health program; i.e., consider output needs first?
4. What data items are needed for those reports?
5. Where are those data items now stored and where can they be otained? (Size of data to be stored.)
6. Should a manual or computerized or combined manual/computer system be utilized?
7. Are there existing systems in the district which can be utilized?
8. What other plans for data systems are being developed within the district--special education, attendance, bus routes, etc.--and are there common needs and shared data?
9. Will there be adequate access to data for school health personnel if a shared data system is chosen?
10. If a computerized system is desired, will it be a mini or a micro; who will operate it; how much will it cost?

Obviously, there are some key elements to consider when developing a school health information system. Many of those elements as implemented by the Lawerence Children's Health Project have been discussed in this report--hardware, software, data items to be stored, and operational considerations, to name a few. Effective planning for a school health record system must be a priority to assure that these important details are considered.

Several sources of information are available to aid in planning and implementing a computerized system, including periodicals (such as Classroom Computer News); special reports (such as Microcomputers in Education: An Introduction by the Northeast Regional Exchange and the Technical Education Research Centers); resource centers (such as the Merrimack Education Center) and retail vendors of hardware and software. If a school district wishes to implement a microcomputer health record system, and Lawrence has proven its usefulness, it will be taking a positive step toward efficient management of data and effective service to students.

APPENDICES

APPENDIX A

DATA BASE STRUCTURE

```
USE B:DEMOG
. DISPLAY STRUCTURE
STRUCTURE FOR FILE:  B:DEMOG.DBF
NUMBER OF RECORDS:   06134
DATE OF LAST UPDATE: 00/00/00
PRIMARY USE DATABASE
FLD       NAME       TYPE  WIDTH     DEC
001       SNAME      C     025
002       SEX        C     001
003       DOB        C     008
004       IDNO       C     009
005       HANDICP    L     001
006       ADDRESS    C     035
007       TELEFON    C     012
008       FNAM:TL    C     033
009       MNAM:TL    C     033
010       ENAM:TL    C     033
011       SCHOOL     C     015
012       GRADE      C     002
013       TEACHER    C     025
014       ROOM       C     004
015       LUNCH      C     001
016       IMMSTAT    C     001
017       HEALREC    L     001
018       PHYSREG    C     001
019       PHYSDAT    C     008
020       PHYSPRO    G     001
** TOTAL **                00250
```

```
          USE C:IMMUN6
. DISPLAY STRUCTURE
STRUCTURE FOR FILE:  C:IMMUN6.DBF
NUMBER OF RECORDS:    00672
DATE OF LAST UPDATE: 00/00/00
PRIMARY USE DATABASE
FLD        NAME        TYPE  WIDTH    DEC
001        IDNO         C     009
002        DTP1DAT      C     009
003        DTP2DAT      C     009
004        DTP3DAT      C     009
005        DTP4DAT      C     009
006        DTPNDAT      C     009
007        DTPSTAT      C     001
008        POL1DAT      C     008
009        POL2DAT      C     008
010        POL3DAT      C     008
011        POL4DAT      C     008
012        POLNDAT      C     008
013        POLSTAT      C     001
014        MEASDAT      C     008
015        MUMPDAT      C     008
016        RUBLDAT      C     008
017        MMRNDAT      C     008
018        MEASTAT      C     001
019        MUMSTAT      C     001
020        RUBSTAT      C     001
021        IMMASGN      C     008
022        IMMRESL      C     008
023        IMMWRKR      C     015
** TOTAL **                00163
.
```

```
  USE C:SCREEN
. DISPLAY STRUCTURE
STRUCTURE FOR FILE:  C:SCREEN.DBF
NUMBER OF RECORDS:   00391
DATE OF LAST UPDATE: 00/00/00
PRIMARY USE DATABASE
F:D       NAME          TYPE WIDTH   DEC
001       IDNO          C     009
002       POSTURSCR     C     001
003       POSTURDAT     C     008
004       POSTURWORK    C     015
005       POSTURASSG    C     008
006       POSTURRESD    C     008
007       VISIONSCR     C     001
008       VISIONDAT     C     008
009       VISIONWORK    C     015
010       VISIONASSG    C     008
011       VISIONRESD    C     008
012       HEARGSCR      C     001
013       HEARGDAT      C     008
014       HEARGWORK     C     015
015       HEARGASSG     C     008
016       HEARGRESD     C     008
** TOTAL **            00130
```

```
. USE C:ENROLL
. DISPLAY STRUCTURE
STRUCTURE FOR FILE:  C:ENROLL.DBF
NUMBER OF RECORDS:   00341
DATE OF LAST UPDATE: 07/29/82
PRIMARY USE DATABASE
FLD       NAME       TYPE  WIDTH    DEC
001       IDNO       C     009
002       CODE       C     001
003       ENROLDAT   C     008
004       EXAMDAT    C     008
** TOTAL **                00027
.

. USE C:HISTORY
. DISPLAY STRUCTURE
STRUCTURE FOR FILE:  C:HISTORY.DBF
NUMBER OF RECORDS:   00351
DATE OF LAST UPDATE: 00/00/00
PRIMARY USE DATABASE
FLD       NAME       TYPE  WIDTH    DEC
001       IDNO       C     009
002       HISTDATE   C     008
003       INTRDATE   C     008
004       COMPLTIME  N     002
005       HISTTAKER  C     015
006       HISTCOMPL  L     001
007       INTRCOMPL  L     001
008       INSURANCE  L     001
009       MEDICAID   L     001
010       PARNTINV   L     001
** TOTAL **                00048
.

. USE C:TESTS
. DISPLAY STRUCTURE
STRUCTURE FOR FILE:  C:TESTS.DBF
NUMBER OF RECORDS:   00000
DATE OF LAST UPDATE: 00/00/00
PRIMARY USE DATABASE
FLD       NAME       TYPE  WIDTH    DEC
001       IDNO       C     009
002       SIKLCELL   L     001
003       TYPE       L     001
004       UA         L     001
005       HEMATCRIT  L     001
006       TB         L     001
007       LEADSCRN   L     001
** TOTAL **                00016
.
```

```
  USE C:DIRECT
. DISPLAY STRUCTURE
STRUCTURE FOR FILE:  C:DIRECT.DBF
NUMBER OF RECORDS:   00371
DATE OF LAST UPDATE: 07/26/82
PRIMARY USE DATABASE
FLD       NAME       TYPE WIDTH   DEC
001       IDNO       C    009
002       DHACOMP    C    001
003       DHADAT     C    008
004       CLOSED     C    001
005       DHATIME    N    002
006       PRACTNR    C    015
007       REFRPROB   C    008
008       REFRNEED   C    001
009       REFRTYPE   C    001
010       CASEWRKR   C    015
011       REFRASGN   C    008
012       REFRCLOS   C    008
** TOTAL **              00078
.


  USE C:DEVELOP
. DISPLAY STRUCTURE
STRUCTURE FOR FILE:  C:DEVELOP.DBF
NUMBER OF RECORDS:   00000
DATE OF LAST UPDATE: 00/00/00
PRIMARY USE DATABASE
FLD       NAME       TYPE WIDTH   DEC
001       IDNO       C    009
002       COREVAL    L    001
003       SSAFDAT    C    008
004       SSAFCOMP   L    001
005       SCHFNSCR   C    002
006       AABSCR     C    002
007       MOTORSCR   C    002
008       TOTALSCR   C    002
009       PRIORITY   C    001
010       COMPLETE   L    001
011       TESTDAT    C    008
012       TESTER     C    015
013       NCONCERN   L    001
014       TCONCERN   L    001
015       ACONCERN   L    001
016       VCONCERN   L    001
017       FCONCERN   L    001
018       GCONCERN   L    001
019       HCONCERN   L    001
** TOTAL **              00060
.
```

APPENDIX B

EXAMPLES OF OUTPUT REPORTS

```
USE B:DEMOG
. GOT _O RED_CORD 3700
. DISPLAY
03700  ORTIZ, MARCOS              M 08/15/68 8-205-985 .F. 104 SPRUCE ST., LAWRENCE MA
    ( )-   -     CARMEN REYES
                          OLIVER          8                          111    C .T.     /
  /
.


USE B:DEMOG
. GOT _O RECORD 2500
. DISPLAY NEXT 5
02500  FERNANDEZ, LINDA           F 12/11/75 8-201-873 .F. 135 GARDEN ST., LAWRENCE MA
       ( )-685-8518 (ALFREDO FERNANDEZ)                  JUANA FERNANDEZ
                                  LEONARD         1  KAREN CADORETTE            13   Y
C .T.     /  /78 5
02501  FLORES, RAFAEL             F 12/20/74 8-201-874 .F. 47 MECHANIC ST., LAWRENCE MA
                    JUAN FLORES                       ISABEL FLORES
 MARGARET ROSARIO, 682-8565       LEONARD         1  KAREN CADORETTE            13   Y
C .T.     /  /
02502  GIRALDO, NATALIE           F 08/30/75 8-201-875 .F. 73 JACKSON ST., LAWRENCE MA
       ( )-   -     RODRIGO GIRALDO                   CARIDAD GIRALDO
 RAMON RODRIGUEZ, 683-3293        LEONARD         1  KAREN CADORETTE            13   Y
C .T.   09/19/81 F
02503  GONZALEZ, RAMON            M 06/29/74 8-201-876 .F. 93 NEWBURY ST., LAWRENCE MA
       ( )-   -     (ANTONO GONZALEZ)                 ANA NILDA GONZALEZ
 JULIA APONTE, 686-9788           LEONARD         1  KAREN CADORETTE            13   Y
C .T.     /  /
02504  ZURICKA, MARIANO           F 05/18/75 8-201-877 .F. 14 [illegible] ST., LAWRENCE MA
       ( )-685-5083 (JUAN ZURICKA)                       DIGNA M  AVILA
 GUILLERMO CABRERAS, 683-8733 (UN) LEONARD         1  KAREN CADORETTE            13   Y
C .T.     /  /
.
```

DISPLAY - Two examples of the DISPLAY command. The data displayed here is everything in the DEMOG database file for the selected students. The user may choose to DISPLAY limited data items.

```
. LIST SNAME GRADE ROOM IMMSTAT FOR SCHOOL ="LAWRENCE HIGH"
00001  ALLICON, LISA                9  413  C
00002  ALON, MARIA                  9       C
00003  DE LA CRUZ, AGUILES          9  416  I
00004  ABATE, KELLY                 9  413  I
00005  ACEVEDO, NOEL                9  413  C
00006  AFONSO, MOISES               9       I
00007  ALICEA, HECTOR               9  413  C
00008  ALVAREZ, MADELINE            9  413  C
00009  ABRAHAM, BILLY M             9       C
00010  AJANEL, ERICKA               9  413  C
00011  ACEVEDO, DANIEL              9  413
00012  ALON, ERENA                  9  413  C
00013  ALVAREZ, NELSON              9  415  C
00014
.
```

LIST - An example of the LIST command. Any fields can be included in the list at the choice of the user.

```
REPORT FORM REPORT !
```

T HEADING TO LEONARD SCHOOL STUDENTS
PORT FORM DEMGLIST FOR C_SCL_HOOL = "LEONARD"

AGE NO. 00001 LEONARD SCHOOL STUDENTS
/17/82

NAME	IDNO	DOB	GR	RM	IMMSTAT	DATE	PHYS	PROVIDER	ADDRESS
RRANO, MARILYN	8-203-653	12/24/73	3	6	I	/	/		32 BROOK ST., LAWRENCE MA
AD, CEASAR A	8-201-638	10/15/76	0	3	I	/	/82	F	60 COMMON ST., LAWRENCE MA
ELLAND, EDGAR	8-201-639	12/26/76	0	3	C	/	/		115 NEWBURY ST., LAWRENCE
RRUBEZ, MARIA E	8-201-640	02/08/76	0	3	C	/	/		33 HAVERHILL ST., LAWRENCE
BRERA, DAVID	8-201-641	03/09/76	0	3	C	/	/		81 HAVERHILL ST., ALWRENCE
NDALARIO, LIN A	8-201-642	11/25/76	0	3	I	/	/		27 SUMMER ST., LAWRENCE MA
SANOVA, YVONNE	8-201-643	12/16/76	0	3	C	/	/		15 BROOK ST., LAWRENCE MA
E, RAYLENE	8-201-644	01/25/76	0	3	I	/	/		5D SUMMER ST., LAWRENCE MA
JESUS, RICHARD A	8-201-645	11/21/76	0	3	C	/	/		50.5 COMMON ST., LAWRENCE
TEVEZ, FRANCISCO	8-201-646	05/29/76	0	3	C	/	/		121 UNION ST., LAWRENCE MA
BIN, CARLINA M	8-201-647	10/03/76	0	3	C	/	/		8 HALL ST., LAWRENCE MA
RRA, FREDDY	8-201-648	02/09/76	0	3	C	/	/		143 UNION ST., LAWRENCE MA
MENEZ, HECTOR	8-201-650	04/18/76	0	3	C	/	/		58 HAVERHILL ST., LAWRENCE
MENEZ, RAFAEL	8-201-651	12/05/76	0	3	C	/	/		50 COMMON ST., LAWRENCE MA
EENE, JAMES R	8-201-652	05/30/76	0	3	C	03/	/80	F	192 GARDEN ST., LAWRENCE M
EENE, JASON WILLIAM	8-201-653	05/12/76	0	3	C	04/	/81	F	192 GARDEN ST., LAWRENCE M
AL, MICHAEL	8-201-654	02/13/76	0	3	C	/	/		79 HAVERHILL ST., LAWRENCE
RISI, JESSICA	8-201-655	12/06/76	0	3	C	/	/		74 E. HAVERHILL ST., LAWRE MA
NA, OSCAR	8-201-656	10/22/75	0	3	C	/	/81	F	123 UNION ST., LAWRENCE MA
REZ, LUIS	8-201-657	02/10/76	0	3	N	/	/81	F	177 NEWBURY ST., LAWRENCE
RIREZ, SANDRA	8-201-658	02/20/76	0	3	I	/	/		45 SUMMER ST., LAWRENCE MA

REPORT FORM - An example of the REPORT FORM command. The structure of the report is defined by the user.

APPENDIX C

HARDWARE/SOFTWARE SPECIFICATIONS AND COSTS

LAWRENCE CHILDRENS HEALTH PROJECT

MICROCOMPUTER
SPECIFICATIONS/DESCRIPTIONS
FOR
MAJOR HARDWARE AND SOFTWARE

dBASE II

WORDSTAR

VIDEX VIDEOTERM

APPLE II SERIAL INTERFACE CARD

RAMCARD

SOFTCARD

CORVUS DISK SYSTEM

LA34 PRINTER

Introduction

dBASE II is a database management tool that allows easy manipulation of small and medium sized databases using English-like commands. With dBASE II you can:

* Create complete database systems.

* Easily add, delete, edit, display and print data from your database, with a minimum of data duplication on file.

* Gain a large measure of program/data independence, so that when you change your data your don't have to change your programs, and vice-versa

* Generate reports from one or more databases, automatically do multiplication, division, sub-totals, totals and other data manipulation every time you use them.

* Use the full-screen editing capability to set up a screen format, so that you see exactly what you're going to get, and enter data by simply "filling in the blanks."

dBASE II is an extremely powerful system. To get the most out of it, please take the time to read the instructions before you start using it. The time will be well spent.

Typographic conventions used in this manual:

Lowercase in the screen representations indicates material that you type in.

Uppercase in the screen representations indicates the dBASE II prompts and responses. In text, uppercase is used for dBASE II commands.

^...^ will be used in the text of this manual to set off dBASE II commands and materials you type. Occasionally, they may are used in the screen representations if needed for clarity. DO NOT TYPE THE SYMBOLS.

[...] square brackets will be used to indicate parts of a dBASE II command that are optional.

<...> bracket portions of a dBASE II command that are to be filled in with real information. E.g.: <filename> means the name of a file is to be inserted. They are also used in text to bracket field names and file names.

<enter> means press the carriage return or "enter" key on your keyboard. DO NOT TYPE THIS WORD, NOR THE SYMBOLS.

System Requirements

dBASE II requires the following hardware and software environment:

* 8080, 8085 or Z-80 based microprocessor system (Like the TRS-80/II, Northstar, Apple II with the Z-80 card, etc.)
* 48K bytes minimum of memory (dBASE II uses locations from 5CH to A400H) for most micros, 56k for Apple, Heath, North Star and a few others.
* CP/M (version 1.4 or 2.x), CDOS OR CROMIX operating systems.
* One or more mass storage devices (usually floppy disk drives)
* A cursor-addressable CRT if full screen operations are to be used.
* Optional text printer (for some commands).

dBASE II Specifications

Records per database file	65535	max
Characters per record	1000	max
Fields per record	32	max
Characters per field	254	max
Largest number	$\pm 1.8 \times 10^{63}$	approx
Smallest number	$\pm 1 \times 10^{-63}$	approx
Numeric accuracy	10	digits
Character string length	254	characters max
Command line length	254	characters max
Report header length	254	characters max
Index key length	100	characters max
Expressions in SUM command	5	max

BEFORE YOU DO ANYTHING ELSE, MAKE A COPY OF THE dBASE II DISC. STORE THE ORIGINAL IN A SAFE PLACE AND USE THE COPY.

Install a system disk in drive A and the dBASE II disk in drive B. Now type:

^PIP A:=B:*.*[OV]^

The letter "O" is necessary to make certain that your operating system will copy all of the data from the distribution disk.

If you are working with a single drive, use the COPY or BACKUP commands, and follow the screen prompts.

Backups are essential, and should be done frequently. If you have a short session on your computer, once a session may be enough, otherwise do it much more frequently than that. You can balance the cost of doing the backups versus the cost of your data better than we can, but since you can rewrite disks, the cost of the backups is low. What's your entire accounting database worth?

This can't be over-emphasized!

Section 2
System Requirements

COMPATIBILITY

WordStar is compatible with a wide variety of hardware configurations, and can share files with other software:

File Compatibility

The disk files used by WordStar for documents are standard CP/M text files, with very minor additions; a "non-document" edit mode is available to suppress even the minor differences. All formatting features such as word wrap, justification, and settable tabs can be individually enabled and disabled. The formatting performed by the print command can be suppressed.

Thus, WordStar is useful as a general purpose text editor/print despooler as well as a self-contained word processing system. It may be used to edit program source files, to input files for other text formatters, for data entry, etc. The print function may be used to print output written to disk by other applications or programs (even while you use the edit function to prepare the input for the next run!).

Terminal Compatibility

Once installed, WordStar's video editing function will operate on almost any CRT terminal or video board 16 x 64 or larger that has a cursor positioning function and that is accessible as a console device under CP/M (also Apple II 16 x 40). If the CRT has line insert and line delete functions, these will be used for split screen update after changes in the text. If the CRT has a highlighting method such as inverse video or bright/dim, the highlighting method will be used to distinguish menus and other prompts from the text being edited, as well as for distinguishing blocks of text "marked" in preparation for block copy, move, or delete. Certain memory-mapped video boards meeting requirements detailed in the Installation Manual can alternately be operated in direct memory access mode for extra fast and smooth screen update.

Printer Compatibility

WordStar will drive almost any printer, whether it is Teletype-like or daisy wheel, and whether it is accessed via CP/M's "list output" logical device or via direct hardware I/O instructions issued by WordStar. OEM daisy wheel and similar printers are supported when used with the MicroPro "I/O Master" S-100 interface board.

For daisy wheel and similar incremental printers, variable line spacing (1 to 127 forty-eighths of an inch), variable character pitch (1 to 127 one-hundred-twentieths of an inch), and automatic microspace justification are supported. For other printers, selection of two character widths is supported (when supported by the printer) and limited user-definable access to other special control sequences is provided. Subscripts, superscripts, and boldface text print differently on non-incremental printers.

VIDEX VIDEOTERM

OWNERS REFERENCE MANUAL

CURTIS WHITE

PAUL DAVIS

DARRELL ALDRICH

SECOND EDITION

AUGUST, 1980

VIDEOTERM Features

The VIDEOTERM Board offers you a great many features, some of which are only found on more expensive video display terminals. A complete list of all features is given below. At the end of each description, a manual page reference is given so that you may immediately read more concerning that feature. This allows you to use this section as a cross-index to the more detailed instructions and information which follow.

<1> 80 Character columns by 24 character lines are displayed at once. The number of lines is changeable to 18. You will definitely want to use the 18 line mode if you have purchased the optional 7 by 12 character matrix EPROM (pages 3-3 to 3-4).

<2> Text is printed in upper and/or lower case at your discretion (page 3-5). All 96 ASCII display characters are available, as are some of the control characters and a set of graphics characters (Table 2, page 3-4).

<3> All text character entry is done directly using the Apple II's keyboard. A "CTRL-A" keystroke sequence is used to shift from upper to lower case, and from lower to upper case (page 3-5). Lower case letters are stored internally as true lower case and do not have a "CTRL-A" embedded with them. Alternate entry keystroke sequences are needed to access some of the VIDEOTERM features. These are all fully defined herein (pages 3-6 to 3-10).

<4> You have direct screen cursor control in Apple's Basic languages using the familiar ESCape key sequences (pages 3-8 to 3-9). In Pascal, cursor control is the same as the Pascal defaults and may be controlled using GOTOXY (pages 3-9 to 3-10 and 4-28).

<5> The VIDEOTERM board is completely compatible with Pascal. You will not need any software 'patches' to make the board work right the first time, every time (page 4-4). Applesoft Basic and Integer Basic usage requires some slight modification to existing user programs and some precautions in writing new programs that access the VIDEOTERM, but these are well-defined and have been kept to a minimum. Such constraints are fully described (pages 4-2 to 4-4).

<6> Both Basics are listed on the VIDEOTERM using all 80 columns. Keywords are not split and you may start or stop listings by using the "CTRL-S" entry just like the Apple Autostart ROM (page 3-8).

<7> The VIDEOTERM board generates an almost immediate response to all inputs. The effective transfer rate between the computer and the display is extremely high, approximately 12,000 BAUD. Speed is enhanced because there is no need to encode the signal into a standard parallel or serial interface format. A very quick screen response is evident in all text printing and scrolling.

<8> The VIDEOTERM board follows all OEM specifications as issued by Apple Computer, Inc. This guarantees that your board will be fully compatible with all

current and future Apple II peripherals (pages 3-1 and 4-30 to 4-33). The economy minded design of the board ensures that the VIDEOTERM board power draw will be low, further reducing peripheral conflicts.

<9> The board is compatible with the Apple Serial Interface board, the CCS Asynchronous Serial Interface board, the D. C. Hayes Micromodem II (using optional customized firmware available from VIDEX), the Microsoft Softcard, and many other peripherals that allow interaction with a video display terminal (page 4-33ff). VIDEOTERM is compatible with the EasyWriter Professional Word Processing System, the Apple PIE editor and other word processors available for the Apple II (page 4-30). With only slight modifications, you will find that most software will work excellently with the VIDEOTERM. And the board is compatible with the VIDEX KEYBOARD ENHANCER, allowing direct lower case text entry from the Apple II keyboard (pages 1-11).

<10> The VIDEOTERM board allows you the option of displaying, either through keyboard or software control, a set of user defined or predefined graphic character sets, in addition to the standard 96 ASCII display characters. Although more limited than the Apple high resolution graphics, many interesting graphical displays can be generated in this fashion. Using the Mountain Hardware ROMWriter (or other EPROM programmer) the user can create any desired graphical or character set (page 4-35ff).

<11> VIDEOTERM in no way interferes with the memory-mapped graphics display of the Apple II itself (page 5-12 to 5-14). You may thus generate graphical output on either of the two high-resolution graphics pages, or display text data on the direct Apple II video monitor and also have a full page of text and/or VIDEOTERM graphics symbols displayed on your black and white monitor.

<12> Optional hardware modifications may be made to the VIDEOTERM. These allow use of a 2708, 2716 or 2758 EPROM for the optional character set, setting the entire screen to inverse video (black characters on a white field), or using the characters eighth bit to invert that one character (the cursor is lost in this last option). These hardware modifications are simple and fully described herein (pages 6-4 to 6-8).

<13> The VIDEOTERM cursor is fully programmable in size and may be set to flash at one of two different rates (page 5-8).

<14> You may simultaneously display on the VIDEOTERM text that is being sent to a printer (pages 4-9 to 4-13). This software may be modified to allow you to examine what your printer will print before actually doing so.

APPLE II SERIAL INTERFACE CARD

INTRODUCTION

These are the fundamental abilities of the APPLE Serial Interface, using the nearly universal RS232 standard:

1. Output from the APPLE II can be sent to a serial printer or other external serial device, to the APPLE's TV screen, or to both. The Serial Interface can supply the necessary line-feeds with carriage-returns, etc.
2. Input for the APPLE II can be taken either from an external device or from the APPLE's keyboard, or from both simultaneously.
3. The APPLE II can handle half-duplex communications at rates from 75 to 19,200 baud, in both directions, with a printer, another APPLE, a terminal, modem or other RS232 external device.
4. The Serial Interface can also be connected for current-loop operation with a Teletype.

While this document is intended primarily for APPLE users who are familiar with the RS232 interface, many of the terms and concepts will be explained.

CHAPTER 1
INTRODUCTION

RAMCard is a printed circuit board that contains 16K bytes of additional random-access memory (RAM) for your Apple II or Apple II Plus computer.

RAMCard is designed for an Apple II with 48K bytes of RAM already in place. If your Apple II has less than 48K RAM, you will need to purchase enough 16K memory modules to bring your Apple II up to 48K.

RAMCard is compatible with Microsoft Consumer Products SoftCard, a circuit card for the Apple which contains a Z80 microprocessor, and allows you to run the CP/M operating system. RAMCard and SoftCard together make a powerful combination that turns your Apple II into a full memory (56K), flexible (two microprocessors) microcomputer.

With RAMCard and SoftCard in place, you have 56K RAM available to run any of the languages available for the SoftCard, including Microsoft's BASIC-80 (included in the SoftCard package), COBOL-80, FORTRAN-80, BASIC Compiler, and Assembly Language Development System.

RAMCard contains 16K of memory. But, because only 12K of additional addressing space is available in the Apple, 4K of addressing space must be shared by two 4K memory banks. This means that only 12K of RAMCard RAM is available to you at a given time.

The Circuit Card

The Microsoft SoftCard is a plug-in card for the Apple II microcom-
modification, but be sure to read the Installation and Operation Manual to ensure that you do it correctly.

Once you have installed the SoftCard, you will be able to operate your Apple in either 6502 or Z-80 mode, using software commands to switch between the two. Whenever you are in 6502 mode, the SoftCard in no way affects operation of your Apple.

When in Z-80 mode, you can run both the CP/M operating system from Digital Research and Microsoft's BASIC interpreter, Version 5.0, which are included in the SoftCard package.

The SoftCard is easy to install and requires no hardware or software
puter that greatly enhances the software capability of the Apple. The SoftCard actually contains a Z-80A microprocessor, allowing the Apple to run software that was written for Z-80 based microcomputers.

CP/M Operating System

Next to the circuit card itself, CP/M is the most important key to allowing a wide variety of Z-80 software to run on the Apple. Version 2.2 of CP/M is included in the SoftCard package.

CP/M (which stands for Control Program/Microprocessors) is an operating system designed for use with 8080 and Z-80 microprocessors. It is composed of many small programs whose collective function is to write information to, and retrieve information from, microcomputer floppy disks. CP/M has been adapted to run on almost all computers using the 8080 or Z-80 families of microprocessors and because of its widespread use, a very large group of high-level languages and application software has been written to operate in the CP/M environment.

With the advent of the SoftCard, Apple owners are now able to take advantage of the CP/M Operating System. Microsoft has implemented CP/M on the Apple II, making all modifications needed to make CP/M run on the Apple.

Standard CP/M programs will be compatible with Apple CP/M. There is just one difficulty in loading them on the Apple: Apple disks have a physically different format than CP/M disks. Before a CP/M program written for another type of computer can be run on the Apple, it must be downloaded from a standard CP/M system to the Apple. This process is described *in detail* in the Software Utilities Manual.

The Softcard Circuit Board

Designer: The SoftCard circuit board was designed by Don Burtis of Burtronix, Villa Park, California. Microsoft Consumer Products is grateful to Burtronix for its contribution to making the SoftCard a reality.

Manufacturer: The SoftCard circuit board is manufactured for Microsoft Consumer Products by Vista Computer Co. of Santa Ana, California.

SoftCard Software

The CP/M operating system, Version 2.0, is licensed by Microsoft from Digital Research, Inc., of Pacific Grove, California. The BASIC interpreter included in this package is Microsoft's ANSI-standard BASIC-80, Version 5.0, with additional enhancements to take advantage of the Apple's special capabilities. Neil Konzen, of Microsoft Consumer Products, was instrumental in implementing all of the SoftCard software on the Apple II.

In addition to supporting a wider variety of software, CP/M offers several convenient features not found in Apple DOS. These include easy interface to machine language programs; faster disk I/O; simple file transfer; and wild card file-naming conventions that allow you to refer to multiple files with one name.

Microsoft BASIC

Microsoft's ANSI-standard BASIC interpreter, in its fifth major release, is also included as part of the SoftCard package. Microsoft BASIC has many features not found in Applesoft. Among these are PRINT USING, CALL, WHILE/WEND, CHAIN and COMMON and built-in Disk I/O statements. In addition, most of the graphics features of Applesoft have been incorporated into Microsoft BASIC to take advantage of the Apple's special capabilities. A complete list of the differences between Microsoft BASIC and Applesoft can be found in Part 4, the Microsoft BASIC Reference Manual.

The Diskettes

Two diskettes, each containing CP/M and Microsoft BASIC plus several utility programs, are provided. One of the disks is in 13-Sector format and should be used if you don't have a Language Card or DOS 3.3. The other disk is in 16-Sector format and should be used with systems that have the Apple Language Card and/or DOS 3.3. The 16-Sector disk also contains an enhanced version of Microsoft BASIC with high-resolution graphics capabilities.

System Requirements

The SoftCard will operate on an Apple II or Apple II Plus microcomputer with a minimum of 48K RAM and one disk drive.

The SoftCard supports the Apple Language Card system and can utilize 12K of the 16K RAM on the Language Card when in Z-80 mode.

CP/M occupies 7K of RAM, only 5K of which is needed during the execution of user programs. CP/M and MBASIC together occupy just over 29K RAM. CP/M and GBASIC (BASIC with high-resolution graphics, found only on the 16-Sector disk) occupy just over 37K RAM.

When you are in 6502 mode, the SoftCard in no way affects operation of the Apple II.

When in Z-80 mode, all standard Apple I/O peripheral cards and some independent peripherals are supported.

Overview

Introduction to the Corvus Disk System

The Corvus Disk System is a microprocessor controlled intelligent peripheral that adds high performance mass storage capability to microcomputers. The Corvus Disk System uses proven Winchester technology to provide reliable high density storage. Systems can be single user or multiple user, the latter linked together in a Corvus Constellation network. In addition, the system can be expanded by adding up to three additional disk drives as a larger data base is needed.

The Corvus disk system uses a Winchester technology drive with a fixed disk in a sealed environment. The low load, low mass Winchester type read-write heads are positioned with a stepping motor and a band actuated assembly on the Model 5AP. The Models 10AP and 20AP use a linear voice coil actuator utilizing a closed loop, track following, servo system to position the read-write heads. The recirculating filtered air flow system within a sealed enclosure prevents contamination. The brushless dc drive motor with built-in disk spindle, motor electronics and speed control provides for a universal 50/60 Hz operation.

Three printed circuit boards, read-write, servo control and controller logic are installed within the base of the disk drive enclosure.

In a drive with Winchester technology, the read-write heads do not touch the disk surface. Instead, they are designed with a wing-like shape that allows them to fly above the surface of the rapidly spinning disk. The heads ride on a cushion of air that suspends them approximately 18 micro-inches (0.46 um) above the disk. That's about a hundredth of the diameter of a human hair. In a floppy drive, the heads actually touch the floppy disk's surface. To provide high speed read-write operations of exceptional accuracy, the disk system incorporates a Corvus intelligent controller with a Z-80 microprocessor.

A single user Corvus System can be configured for up to four high speed disk drives, a microprocessor based intelligent controller, and a interface card that links the controller to your computer.

There is, however, a potential problem that exists in all Winchester drives; the heads rest on the media when powered down. The head is attached to the body of the drive (the main mass) by a flexure arm. This arm is a long thin cantilever with a high magnification factor at certain frequencies. With this arrangement, shocks applied to the main mass can produce shocks magnified over 100 times to the heads. An acceleration of

Disk System Specifications

5 Megabyte Drive Specifications

Operational Specifications

Number of platters	2
Number of data surfaces	4
Number of tracks per surface	144
Bytes per sector (formatted)	512
Sectors per track (formatted)	20
Bytes per drive (formatted)	5.65 Mb
Track density	200 tpi
Bit density	8,800 bpi
Rotational speed	4,800 rpm ± 1%
Average latency	6.25 ms
Single track access time	3 ms
Average access time	125 ms
Maximum access time	240 ms
Settling time	40 ms
Data transfer rate (to internal controller RAM)	960 kb/sec (5.1 mega HZ clock rate)
Recording code	MFM
Heads per surface	1
Data heads	4
Start time	30 seconds (maximum)
Stop time	7 seconds (maximum)

Physical Dimensions

Height (inches/centimeters)	5.25/13.34
Width (inches/centimeters)	14.50/36.83
Length (inches/centimeters)	15.00/38.10
Vertical rack space (inches/centimeters)	6.25/15.88
Rack depth (inches/centimeters)	14.00/35.56
Weight (pounds/kilograms)	24/11

2 gravities (G's), applied to the main mass could result in a 200 G shock applied to the heads.

A critical shock is produced by banging the drive on a table while moving it or by dropping one end less than an inch while mounting it in an enclosure. These actions result in lifting the heads off the media and forcing them back down again. Remember, the drive is a precision instrument and must be handled carefully.

Primary features of the Corvus Disk Drive are:

- Fixed Media (magnetically oriented and lubricated)
- Winchester type recording features
- Sealed environment, clean air filter system
- Brushless dc Drive Motor
- Small size
- No scheduled maintenance
- Daisy chain up to 4 drives (original drive and three add-on drives)

Reliability

The Mean Time Between Failures is calculated to exceed 10,000 hours. The Mean Time To Repair will not exceed 0.5 hours. There is no preventive maintenance required on the Corvus Disk Drive.

Environmental Specifications

Operating temperature	50° F to 113° F (10° C to 45° C)
Temperature variation	18° F (10° C) per hour (no condensation)
Operating relative humidity (no condensation)	10% to 80% R.H.
Operating altitude	-1,000 to +10,000 feet (-305 to 3,050 meters)
Operating vibration	0.1 G (5 cps linear increase to 100 cps)
Non-operating temperature	-40° F to 140° F (-40° C to 60° C)
Non-operating relative humidity (no condensation)	10% to 80% R.H.
Non-operating vibration	1.0 G (10 cps linear increase to 100 cps)
Non-operating shock	5.0 G for 5 ms duration

• LA34 SPECIFICATIONS

Spacing	
Horizontal	10 characters/inch with a maximum of 132 characters/line; 12 characters/inch with a maximum of 158 characters/line; 13.2 characters/inch with a maximum of 168 characters/line, or 16.5 characters/inch with a maximum of 216 characters/line User selected
Vertical	2, 3, 4, 6, 8, or 12 lines/inch User selected
Characters	96 upper/lower case ASCII 7X9 dot matrix
Printing	10 or 30 characters/second Switch selected
Paper	Roll feed
Width	7.62 to 37.78 cm (3 to 14-7/8 in)
Weight Single-part	6.8 kg (15 lb) paper minimum
Roll diameter	4-1/2 inch maximum
Core diameter	1 inch

NOTES

1. *Multipart forms are not recommended.*
2. *Impact paper is not recommended.*
3. *Card stock is not recommended.*

Sprocket Feed	
Width	7.62 to 37.78 cm (3 to 14-7/8 in)
Weight Single-part	6.8 kg (15 lb) paper minimum 0.25 mm (0.010 in) thick card stock maximum
Multipart	1 to 4 parts (see notes) 0.50 mm (0.020 in) thick maximum

NOTES

1. *Multipart forms may have only one card part; the card must be the last part.*
2. *First surface impact paper is not recommended.*
3. *Dot or line glue margins are acceptable (if line is on one margin only).*
4. *Split forms (forms with eachside containing a different number of sheets) are not recommended.*

Ribbon Cartridge	
Dimensions	
Length	10.64 cm (4.188 in)
Width	14.15 cm (5.570 in)
Height	1.42 cm ± .051 cm (.560 in ± .02 in)
Ribbon Fabric	
Material	Nylon, non-textured
Thickness	.066 mm – .1076 mm (.0034 in – .0042 in)
Width	1.27 cm ± .0381 cm (.50 in ± .015 in)
Ribbon Life	16 hours of continuous printing
Power	
Voltage	90–128 VAC 180–256 VAC (Switch selectable)
W maximum	Printing 45 W
W maximum	Non-printing 25 W
Temperature	
Operating	10° to 40° C (50° to 104° F) Noncondensing
Nonoperating	–40° to 66° C (–40° to 151° F) Noncondensing
Relative Humidity	
Operating	10 to 90 percent with a maximum wet bulb temperature of 28° C (82° F) and a minimum dew point of 2° C (36° F) Noncondensing
Nonoperating	5 to 95 percent
Dimensions	
Length	55.9 cm (22 in)
Width	16.4 cm (16.4 in)
Height	18.3 cm (6.5 in)
Terminal Weight.	10 kg (22 lbs)

LAWRENCE CHILDRENS HEALTH PROJECT

HARDWARE/SOFTWARE COSTS

HARDWARE*	
APPLE II PLUS MICROCOMPUTER W/48K MEMORY, 2 DISK DRIVES, & 1 DRIVE CONTROLLER	$1,800
CORVUS 5.7 MEGABYTE DISK SYSTEM	3,300
ZENITH 12" (GREEN) MONITOR	110
HARDWARE MODIFIERS	
Z-80 SOFTCARD (CP/M) & VIDEX BOARD (80 COLUMNS)	600
APPLE SERIAL CARD (TO CONNECT PRINTER)	190
MICROSOFT 16K RAMCARD (TO EXPAND APPLE'S MEMORY)	170
APPLE FAN (TO KEEP APPLE COOL)	50
SOFTWARE	
dBASE II	700
WORDSTAR (WORD PROCESSING)	250
APPLE PASCAL	230
CORVUS CP/M	200
TOTAL	$7,600

*Equipment available - no purchase necessary
Printer 9DEC - LA34)
Videocassette Recorder (Sony)

Approximate values - August 1982

APPENDIX D

MAJOR FORMS

Department of Public Schools
Lawrence, Massachusetts

PUPIL REGISTRATION FORM

Date _____

School _____ Grade _____

Name of Pupil _____

Address of Pupil _____ Home Phone _____

Pupil's Date of Birth _____ Verified _____

Pupil's Place of Birth _____

Father's Name _____

Father's Occupation _____

Father's Business Address _____ Phone _____

Mother's Name _____

Mother's Occupation _____

Mother's Business Address _____ Phone _____

Guardian's Name _____ Phone _____

Language Spoken at Home _____

Number of Children in Family _____ Boys _____ Girls _____

Number of Older Boys _____ Older Girls _____

Number of Younger Boys _____ Younger Girls _____

EMERGENCY:

Name _____ Relationship to Child _____

Address _____ Phone _____

Family Physician _____

Immunization Record Attached Yes _____ No _____

What language did your child first learn to speak? _____

What language do you use when speaking to your child at home? _____

What language does your child use when speaking to you at home? _____

What language does your child use when speaking to brothers, sisters and friends? _____

Parent's signature

Departamento de Escuelas Públicas
Lawrence, Massachusetts

INFORME DE MATRICULA

Fecha _____

Escuela _____ Grado _____

Nombre del Niño(a) _____

Dirección del Niño _____ Teléfono _____

Fecha de Nacimiento _____ Verificado _____

Lugar de Nacimiento _____

Nombre del Padre _____

Lugar donde Trabaja _____

Dirección _____ Teléfono _____

Nombre de la Madre _____

Lugar donde Trabaja _____

Dirección _____ Teléfono _____

Nombre del Encargado _____ Teléfono _____

Idioma que se habla en casa _____

Numero de hijos en la familia _____ Hermanos _____ Hermanas _____

Numero de varones mayores _____ Hembras mayores _____

Numero de varones menores _____ Hembras menores _____

En caso de EMERGENCIA:

Nombre _____ Parentezco al niño(a) _____

Direccion _____ Teléfono _____

Doctor de Familia _____

Copia del Certificado de Vacunación incluida Si _____ No _____

¿Que idioma aprendio su niño a hablar primero? _____

¿En que idioma le habla usted al niño en la casa? _____

¿Que idioma usa su niño para hablar con ustedes en la casa? _____

En que idioma habla el niño con sus hermanos y amigos? _____

(SCHOOL NURSE) MAILING BOX TO BE FORWARDED TO 486 ESSEX STREET.

LAWRENCE HEALTH SERVICE

TRANSFER (IN)

IN

EFFECTIVE DATE: _____

Name of Student: _____

Address
New _____

or
Previous _____

Date of Birth: __ __ __ __ __ __
Mo Day Yr

FROM	TO
SCHOOL _____	SCHOOL _____
ADDRESS _____	ADDRESS _____
GRADE _____	GRADE _____
ROOM _____	ROOM _____

/____/ Immunization record attached for review.

/____/ Medical records attached for review.

/____/ Forward medical records to principal for transfer.

/____/ Student/Medical records requested from previous school.

COMMENTS
(if appropriate)

TO BE COMPLETED BY SCHOOL AT TIME OF REGISTRATION OR TRANSFER AND [illegible]
(SCHOOL NURSE) MAILING BOX TO BE FORWARDED TO 486 ESSEX STREET.

LAWRENCE HEALTH SERVICE

TRANSFER (OUT)

OUT

EFFECTIVE DATE: _____

Name of Student: _____

Address
New _____

or
Previous _____

Date of Birth: ___ ___ ___
Mo Day Yr

FROM	TO
SCHOOL _____	SCHOOL _____
ADDRESS _____	ADDRES _____
GRADE ____	GRADE ____
ROOM ____	ROOM ____

/___/ Immunization record attached for review.

/___/ Medical records attached for review.

/___/ Forward medical records to principal for transfer.

/___/ Student/Medical records requested from previous school.

COMMENTS
(if appropriate)

MICROFILMED FROM
BEST AVAILABLE COPY

SCHOOL LCHP -- HEALTH RECORD DATA SHEET

Please Type or Print Black Ink Students Combined Alphabetical LAST FIRST	DATE OF BIRTH	1 DATE OF PHYSICAL MD or LCHP	IMMUNIZATION - DATES						2								3 TB	HEARING			VISION			POSTURE			LAB		8 TE	9	SUMMARY OF NEEDS
			I Polio	II Polio	III Polio	Polio Booster	I DPT	II DPT	III DPT	IV Booster	Measles	Mumps	Rubella	Immunization Status	T.B. Date	Date	Pass/Fail/N.Rec.	Hearing Status	Date	Pass/Fail/N. Rec.	Vision Status	Date	Pass/Fail/N. Rec.	Posture Status	Hct/Feb	Urine	Date Priority	CORE		

178

177

APPENDIX G

LETTER OF AGREEMENT WITH LAWRENCE PUBLIC SCHOOLS

Merrimack education center 101 Mill Road, Chelmsford, Ma 01824
617-258-3985

Staff
Richard J. Lavin
Executive Director
Leslie C. Bonnet
Associate Director
Jean E. Sanders
Associate Director

Executive Board
William C. Allard
Lunenburg
Bartolomeo Balsamo, Jr.
Ayer
Fred G. Blanchard
Westford
Walter Pilas
Western Electric
Peter V. Gardell
North Andover
James Hammond
Chancellor Emeritus
Paul Heffernan
Billerica
Richard Meade
Arthur D. Little, Inc.
Thomas Michael
Burlington
D. Stanley Petey
Groton-Dunstable
Eugene Thayer
Lawrence
John W. Wynn
Tewksbury
Zdanowicz
Methuen

July 6, 1982

Dr. Eugene Thayer
Superintendent of Schools
Lawrence Public Schools
237 Essex Street
Lawrence, MA 01840

Dear Dr. Thayer:

The purpose of this letter is to confirm the nature and scope of our efforts to provide health services for the Lawrence Public Schools for the fiscal year, July 1, 1982 - June 30, 1983.

The Merrimack Education Center, through the Lawrence Health Project and in cooperation with the Lawrence Public Schools, will provide the following services:

- Complete a comprehensive health examination on approximately 3,000 Medicaid eligible children and youth, grades K-12;
- Maintain the student health records for all public school students, K-12;
- Determine the immunization status of all students, K-12;
- Provide vision and hearing screens for all students where appropriate;
- Complete the requirements for posture screening;
- Assist the Lawrence Public Schools in the supervision of school nurses as appropriate;
- Follow-up with families of children with identified serious health concerns;
- Provide the superintendent's office, on a regular basis, up-date reports on program activities and results.

Based upon preliminary budget projections (enclosed), in addition to the receipt of third party payments, $25,000 will be necessary from the Lawrence Public Schools to support this program. It is our understanding that these monies will be made available and will be invoiced at the rate of $2,500 a month for ten months beginning in July of 1982.

It is recognized that either party, after review, may terminate this understanding with reasonable notice.

We would be happy to discuss and refine the nature and scope of the above services at any time as your needs are further defined. If these arrangements are in accordance with your understanding of our arrangement, please sign a copy of this letter in the space provided and return it to me.

Very truly yours,

William H Flaherty Jr.

William H. Flaherty, Jr.
Associate Director

WHF/mjs
Enclosures

Acknowledge:

LAWRENCE PUBLIC SCHOOLS

_____
Eugene Thayer, Superintendent

_____
Date

APPENDIX H

ABT EVALUATION REPORT - "LAWRENCE CHILDREN'S HEALTH PROJECT:
A DEMONSTRATION OF A COLLABORATIVE BROKERING MODEL AND SCHOOL BASED EPSDT"

(under separate cover)